



FRIDAY, JANUARY 29.

Train Accidents in December.

The following accidents are included in our record for the month of December:

COLLISIONS.

REAR.

3d, a. m., freight on Alabama Great Southern broke in two near Porterville, Ala., and rear section ran into forward one, wrecking several cars, killing a brakeman and injuring the conductor.

4th, a. m., freight on Missouri, Kansas & Texas ran into another freight in Denison, Tex., damaging several cars.

4th, night, passenger train on Cincinnati, Indianapolis & Chicago ran into freight car blown out of siding by a high wind, and the engine and 3 cars were damaged, injuring the engineer.

5th, a. m., passenger train on Lehigh Valley ran into rear of a freight near Catasauqua, Pa., wrecking a caboose and injuring a brakeman.

5th, night, coal train on New York, Lake Erie & Western ran into some cars broken loose from preceding freight near Port Jervis, N. Y., damaging several cars.

6th, a. m., freight on Chicago, St. Louis & Pittsburgh ran into preceding freight at Mingo Junction, O., damaging several cars.

6th, night, freight on New York, Lake Erie & Western broke into two near Binghamton, N. Y., and rear section ran into forward one, wrecking 2 cars.

8th, a. m., freight on Burlington, Cedar Rapids & Northern ran into 2 cars blown out from a siding upon the main track near Bard, Ia., and an engine and 8 cars were damaged.

9th, a. m., coal train on Erie & Wyoming Valley broke in two near Summit, Pa., and rear section ran into forward one, wrecking 5 cars.

10th, night, freight on East Tennessee, Virginia & Georgia broke in two near Roseland, Ga., and rear section ran into forward one on a trestle and 17 cars were thrown from the trestle and wrecked.

10th, a. m., freight on Atlanta & West Point broke in two near Long Cane, Ga., and rear section ran into forward one, driving the front car up upon the tender and wrecking it, killing an engineer and injuring a fireman.

11th, p. m., passenger train on Wabash, St. Louis & Pacific ran over a misplaced switch in Detroit, Mich., and into some cars on a siding, wrecking 2 cars and injuring a laborer.

14th, midnight, East Tennessee passenger train ran into Georgia Pacific passenger train, which had stopped for water near Austell, Ga., on the track used by both roads. It is claimed that the East Tennessee train was running at too high a speed, and without keeping proper lookout for other trains. The collision wrecked the Georgia Pacific passenger cars completely, killing 10 passengers, injuring 4 others fatally and 6 less severely. The East Tennessee locomotive passed almost entirely through the rear car of the other train, and most of those fatally hurt were scalded by the escaping steam from the locomotive.

17th, early, freight on Central Vermont broke in two near Montpelier Junction, Vt., and rear section ran into forward one, damaging several cars.

17th, a. m., freight on East Tennessee, Virginia & Georgia ran into preceding freight which had stopped for water at Greenville, Tenn., and had sent out no flag. Eleven cars were wrecked.

21st, night, freight on Michigan Central ran into preceding freight near Chesaning, Mich., wrecking the caboose and killing a trainman.

23d, night, passenger train on Boston & Lowell ran into rear of freight near Billerica, Mass., wrecking 2 cars and injuring 2 trainmen. The freight was just going on a siding and had sent back a flag, but the man did not go far enough.

25th, a. m., passenger train on Cleveland, Columbus, Cincinnati & Indianapolis ran into some cars broken loose from a preceding freight near Marion, Ind., damaging several cars.

26th, very early, freight on Pittsburgh, Cincinnati & St. Louis ran into preceding freight just going into a siding at Philadelphia Roads, Pa., wrecking engine and several cars, injuring 2 trainmen and a tramp. It is said that all the crew of the second train were asleep in the caboose and did not hear the engineer's call for brakes.

27th, a. m., 6 cars of freight on Atlantic & Danville broke loose from a train at Claremont, Va., and ran back down grade and into some other cars standing on the wharf, throwing them into the James River.

29th, p. m., freight on Louisville, New Orleans & Texas ran into rear of construction train near Knoxville, Miss., wrecking the caboose and injuring 2 trainmen.

29th, night, freight on Chicago, St. Louis & Pittsburgh ran into preceding freight near Logansport, Ind., wrecking engine and 5 cars. It is said that the second train was beyond control, the brakes failing to hold it.

30th, a. m., freight on Florida Railway & Navigation Co.'s line ran into preceding freight near Wellborn, Fla., wrecking several cars, killing the conductor and injuring a passenger in the caboose.

30th, a. m., freight on Wabash, St. Louis & Pacific ran into preceding freight near Kinder, Ill., wrecking several cars, killing conductor and injuring two other trainmen.

30th, a. m., freight on Buffalo, Rochester & Pittsburgh broke in two near Bradford Junction, Pa., and rear section ran into forward one, wrecking several cars.

31st, a. m., passenger train on Houston & Texas Central ran into rear of freight near Garrett, Tex., wrecking 2 cars and injuring 9 passengers in the caboose, 2 of them seriously.

31st, p. m., freight on New York, Lake Erie & Western ran into cars broken loose from a preceding freight near Otisville, N. Y., wrecking 6 cars and injuring a brakeman.

BUTTING.

2d, p. m., butting collision between two freights on Baltimore & Ohio, near Washington, Pa., wrecked both engines and a number of cars, killing 2 trainmen and injuring 7 others.

3d, a. m., butting collision between passenger and freight train on Vicksburg, Shreveport & Pacific, near Monroe, La., wrecked both engines and 1 car and killed one passenger.

12th, very early, butting collision between two freights on Pittsburgh, Fort Wayne & Chicago, near Leetonia, O., piled up both engines and 11 cars in a very bad wreck, injuring 4 trainmen severely and blocking the road nearly all day.

7th, night, butting collision between two freights on Pittsburgh, Cincinnati & St. Louis, near Denison, O., wrecked

both engines and 6 cars and killed a brakeman. The accident is said to have been caused by the mistake of an operator.

18th, a. m., butting collision between two freights on Lake Shore & Michigan Southern, near Laporte, Ind., wrecked both engines and 9 cars.

22d, p. m., butting collision between two freights on Western North Carolina, near Marion, N. C., wrecked both engines and several cars, killing 3 trainmen and injuring 5 others. It is said that the conductor of one of the trains had his watch an hour slow.

30th, night, butting collision between two freights on Michigan Central, near Carrollton, Mich., wrecked both engines and several cars, killing a fireman and injuring an engineer and another fireman.

31st, night, butting collision between freight and wild engine on Michigan Central, near Frankfort, Ill., damaged both engines and several cars.

CROSSING.

3d, a. m., Indiana, Bloomington & Western freight ran into Columbus & Cincinnati Midland freight at crossing near Columbus, O., damaging both engines and injuring a fireman.

6th, a. m., Indiana, Bloomington & Western freight ran into Columbus, Hocking Valley & Toledo freight at the crossing in Carey, O., damaging engine and several cars and injuring an engineer.

DERAILMENTS.

BROKEN RAIL.

4th, very early, passenger train on Texas & Pacific was derailed on a small bridge near Gordon, Tex., by a broken rail, and one car went off the bridge and fell into the creek on its side, injuring 2 passengers badly and 45 slightly.

11th, night, passenger train on Illinois Midland was derailed near Filson, Ill., by broken rail.

15th, a. m., passenger train on Wabash, St. Louis & Pacific was derailed near Centralia, Mo., by a broken rail and 7 passengers were slightly hurt.

15th, night, passenger train on Union Pacific was derailed near Market Lake, Idaho, by a broken rail. A trainman was killed and 8 passengers slightly injured.

30th, early, freight on West Jersey was derailed near Husted, N. J., by broken rail, wrecking 7 cars.

BROKEN FROG.

28th, p. m., freight on New York, Lake Erie & Western was derailed near Middletown, N. Y., by broken frog.

BROKEN BRIDGE.

10th, a. m., freight on New Brunswick road broke through bridge near Fredericton Junction, N. B., and the engine went down into the river. The firemen were drowned and the engineer hurt. The abutments had been weakened by a freshet.

SPREADING OF RAILS.

1st, a. m., 10 cars of freight on Vicksburg & Meridian were derailed near Chunky, Miss., by spreading of the rails.

1st, a. m., engine of freight on St. Louis, Iron Mountain & Southern was derailed at Gurdon, Ark., by spreading of the rails and upset. A man was caught under the engine and burned to death.

4th, early, passenger train on Canadian Pacific was derailed near Sudbury Junction, Man., by the spreading of the rails. The whole train left the track and upset and 3 cars were burned. There were 7 passengers hurt.

11th, night, passenger train on Little Rock, Mississippi River & Texas was derailed near Arkansas City, Ark., by spreading of the rails, and 2 cars upset, injuring 3 trainmen and 5 passengers.

18th, very early, 2 cars of passenger train on East Tennessee, Virginia & Georgia were derailed near Chattanooga, Ga., by spreading of the rails.

BROKEN AXLE.

29th, a. m., engine of freight on Philadelphia, Wilmington & Baltimore was derailed at Presbyterian Ford, Pa., by a broken axle and rolled over down a bank, killing the engineer and injuring the fireman and 2 brakemen who were on the engine.

30th, p. m., freight on Philadelphia & Reading was derailed near Middlebrook, N. J., by broken axle and 4 cars wrecked.

BROKEN TRUCK.

29th, night, 10 cars of coal train on New York, Lake Erie & Western were derailed near Starrucca, Pa., by a broken truck.

ACCIDENTAL OBSTRUCTION.

27th, early, passenger train on New York, New Haven & Hartford was derailed at Pelhamville, N. Y., by planks torn up from the station platform and blown on the track by a high wind. The engine and mail car rolled over down a high bank, killing the fireman, injuring the engineer and 3 postal clerks.

LAND-SLIDE.

13th, night, passenger train on East Tennessee, Virginia & Georgia ran into a land-slide near Cleveland, Tenn., and engine and several cars were thrown from the track and an express messenger badly hurt.

SNOW.

6th, a. m., freight on Delaware, Lackawanna & Western was derailed in Buffalo, N. Y., by snow.

MISPLACED SWITCH.

3d, very early, passenger train on New York, Lake Erie & Western was derailed near Scio, N. Y., by misplaced switch and several cars were badly damaged, and the wreck caught fire. Baggage car and 1 sleeper were destroyed. The engineer was caught under the engine and killed.

5th, night, freight on Cleveland, Columbus, Cincinnati & Indianapolis was derailed at Catawba, O., by misplaced switch.

16th, a. m., engine and 3 cars of freight on St. Louis, Alton & Terre Haute were derailed in East St. Louis, Ill., by a misplaced switch. Two trainmen were slightly hurt.

18th, night, passenger train on Toledo, Ann Arbor & North Michigan was derailed near Alexis, O., by misplaced switch.

22d, early, engine of freight on New York, Lake Erie & Western was derailed near Port Jervis, N. Y., by misplaced switch.

UNEXPLAINED.

7th, a. m., two cars of freight on Northern, of New Jersey, were derailed at Homestead, N. Y., blocking the road two hours.

8th, night, engine of freight on Allegheny Valley was derailed in Pittsburgh, Pa., and upset.

10th, p. m., car of passenger train on Bellaire, Zanesville & Cincinnati was derailed near Caldwell, O., and upset down the bank, injuring 6 passengers.

12th, a. m., 7 cars of freight on Flint & Pere Marquette were derailed near Manistee, Mich., and a brakeman was hurt.

13th, a. m., freight on Buffalo, New York & Philadelphia was derailed at Portville, N. Y., wrecking 4 cars and injuring a brakeman.

18th, noon, car of passenger train on New York, Lake

Erie & Western was derailed in Paterson, N. J., doing some damage.

18th, p. m., coal train on Pennsylvania Coal Co.'s gravity road broke loose near Dunmore, Pa., and after running several miles at great speed jumped the track, the whole train falling into a deep ravine. Singularly enough this wreck occurred on the last day of the operation of the road, the gravity road having been abandoned for a new line.

18th, night, passenger train on Canadian Pacific was derailed at St. Martin Junction, Que., and the engine upset, killing the fireman and injuring the engineer.

28th, a. m., freight on Richmond & Danville was derailed near Goldsboro, N. C., wrecking 3 cars and injuring the conductor.

OTHER ACCIDENTS.

BOILER EXPLOSION.

4th, a. m., locomotive of passenger train on Georgia Railroad exploded its boiler when near Barnesville, Ga., killing the engineer and injuring the fireman.

BROKEN PARALLEL ROD.

5th, a. m., engine of passenger train on Pittsburgh & Lake Erie broke a parallel rod when near Beaver Falls, Pa., damaging the engine badly.

30th, night, engine of freight on Missouri Pacific broke a parallel rod when near Atchison, Kan., damaging one side badly.

MISCELLANEOUS.

11th, a. m., car of freight on New Orleans & Northeastern caught fire when near Meridian, Miss., and was destroyed.

31st, night, as freight on New York, Lake Erie & Western was passing through a cut near Guyard, N. Y., a large rock rolled down the side of a cut and struck the engine, smashing the cylinder and other machinery on one side.

SUMMARY.

This is a total of 74 accidents, in which 31 persons were killed and 153 injured. As compared with December of last year, there was a decrease of 31 accidents, but an increase of 7 killed and 44 injured. The number of accidents was unusually light for December.

The twelve months of 1885 show a total of 1,217 accidents, 307 killed, and 1,530 hurt: an average per month of 101 accidents, 26 killed and 128 injured.

A fuller statement of the totals and averages, with a summary of the causes of accident, will be found on another page.

The Pennsylvania Railroad Relief Department.

The Pennsylvania Railroad Co. has for some time had under consideration the question of providing a plan by which those in its service may be associated for the purpose of securing specific relief for themselves and families in cases of accident, sickness and death. After a careful inquiry into existing plans having similar objects in view, and the special requirements of its employees, the company has formulated a plan which, it is believed, will be of permanent benefit, and to which the company has determined to render its aid by giving its facilities and authority to promote the same, contributing liberally for its support, and guaranteeing the fulfillment of the obligations assumed under it.

This plan has been approved by the board of directors, and printed copies thereof can be obtained by employees from the division officers. The general features of this plan are as follows:

First. The creation of a new department in the service, to be known as the Pennsylvania Railroad Relief Department, having for its object the establishment and management of a fund, to be known as the Relief Fund, for the payment of definite amounts to employees who, under the regulations, shall become entitled thereto, when they are disabled by accident or sickness, and, in the event of their death from accident or natural causes, to their relatives or other beneficiaries. In connection therewith, the department is to exercise supervision over sanitary matters affecting the health of employees, put in operation measures to secure conditions favorable thereto, and take charge of such kindred matters as may be assigned to it.

Second. The fund will be created by an application to that purpose, under contracts of employment, of portions of the wages of employes, at uniform rates, graded in amount according to their regular pay. The company will be trustee for the fund and responsible therefor, pay any deficiencies which may arise from the fund not proving sufficient to meet the demands upon it, manage the department, pay the operating expenses, furnish the necessary office room, and grant the services of its officers and agents without charge upon the fund.

Third. Those who shall become entitled to the benefits of the fund will be known as "Members of the Relief Fund." Their admission to its privileges will be based on applications to be made by them in the form and under the terms prescribed in the regulations of the department.

Fourth. The department will be in charge of a superintendent, who will be aided by an advisory committee consisting of members, chosen equally by the employees who are members of the fund and by the board of directors of the company, with the General Manager of the company and the Superintendent of the Relief Department as *ex-officio* members.

Fifth. The benefits will consist chiefly in: Payments of stated amounts to members disabled by sickness or by injuries received in the discharge of their duties; payments of stated amounts to designated relatives or other beneficiaries of deceased members; free surgical attendance for members disabled by injuries in the discharge of their duties; arrangements for fixed moderate rates, of which members may avail themselves, for medical attendance in cases of ordinary sickness; medical supervision over sanitary and other matters affecting the health of members.

Sixth. For the purpose of determining the monthly rates, members will be divided into classes, according to the amount of their regular wages per month, as follows:

1st Class—Those receiving not more than \$35.

2d Class—Those receiving more than \$35 and not more than \$60.

3d Class—Those receiving more than \$60 and not more than \$80.

4th Class—Those receiving more than \$80 and not more than \$100.

5th class—Those receiving more than \$100.

For members not paid by the month, the classes will be determined by the usual amount of earnings per day.

As far as practicable, those in similar grades of the same kind of service will be classed together without regarding slight variations in the pay of individuals from the limits assigned for the several classes.

The rates for the first class will be 75 cents per month; for the second class, twice as much, \$1.50; for the third class,

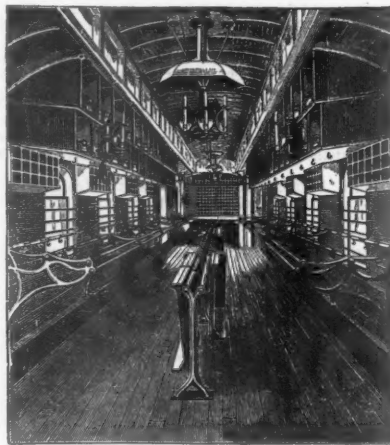
three times as much, \$2.25; for the fourth class, four times as much, \$3.00; and for the fifth class, five times as much as for the first, \$3.75.

The amounts applied by employes to the purposes of the Relief Fund will be deducted from their wages on the payrolls monthly in advance, and placed to their credit in the fund.

Seventh. The accident benefits per day, not including Sundays, are for the first 26 weeks: First class, 50 cents; 2d class, \$1; 3d class, \$1 50; 4th class, \$2, and 5th class, \$2 50. After 26 weeks the benefits are half the above figures. The sick benefits per day, not including the first week or Sundays, and not longer than 52 weeks, are the same as for accident benefits for the first 26 weeks.

The payment made at the event of death from accident are to be: First class, \$500; second class, \$1,000; third class, \$1,500; fourth class, \$2,000; and fifth class, \$2,500. In cases of death from nature, cause, the benefits are one-half the amount given in the event of death from accident. Under specified conditions members may enter classes higher than those to which their pay assigns them and may take additional natural death benefits.

Eighth, in order that the cost of the proposed benefits may be as small as possible, and each member derive all possible benefit from his payments to the Relief Fund, the number participating must be large and regular. In view of this and of the responsibility assumed by the company, it will be a condition that each person entering the service or promoted to a position of responsibility must first become a member of the Relief Fund and participate in its benefits. Persons in the service at that time will, for six months there-



Pitch of pigeon holes.....	1 1/4 in 7 in.
Pigeon holes.....	4 1/4 in. x 4 in. in the clear
Horizontal partitions of pigeon holes.....	3/8 in.
Perpendicular partitions of pigeon holes.....	5/8 in.
Frame of same.....	5/8 in.
Casing for frame.....	3/4 in.

MAIL CRANE (ON GROUND).

Post.....	4 in. by 4 in.
Arms.....	3 in. by 4 in.
Brace.....	2 1/4 in. by 4 in.
Platform.....	2 ft. 6 in. square, 2 ft. 6 in. high.
Height of post.....	11 ft. 4 in.
Height to centre of arm.....	10 ft. 8 in.
Length of arm.....	3 ft. 10 in.
Distance from centre of rail to centre of post.....	9 ft. 4 1/4 in.
Distance from centre of socket on car to centre of upper arm.....	17 in.
Distance from end of arm to side of car.....	7 1/4 in.

The folding bag, racks and tables and other devices special to this car are patented and are manufactured by the Harrison Postal Bag Rack Co., Fond du Lac, Wisconsin, from whom any further information may be obtained.

The Master Car-Builders' Club on the Rules for Repairs of Interchanged Cars.

A meeting of the Master Car-Builders' Club was held at the rooms, No. 113 Liberty street, New York, Jan. 21, Mr. Leander Garey in the chair.

The subject for discussion was "The Rules Governing Condition of and Repairs to Cars Used in Interchange Traffic."

The attendance was very limited, but some letters (summarized below) were read suggesting amendments to the rules.

Mr. VERBRYCK (Chicago, Rock Island & Pacific): Rule 3, sec. "f," should be amended, 3 1/4 in. limit for 40,000-lb. cars, and 3 in. for 30,000 lbs. Rule 5: Cards should be filled in with ink. Rule 8: All wheels removed to be reported to owner is unnecessary. Rule 9: Wording vague. Rule 18: Might be left out.

I. B. HENNEY (New York, New Haven & Hartford): Price should be fixed for changing wheels too narrow to gauge. Rule 10: The difference between "chipped" and "broken" should be defined. Wheels changed should be of same quality.

W. McWOOD (Grand Trunk): Rule 3, sec. A: "Wheels cracked or broken," would add "except when delivered to owners." Carding system should be limited. Rule 9: Prices for second-hand wheels too high; \$2 per pair ample. No charge should be made for turning axles, unless new. Rule 12 to read: "The ends of the splice to be not less than 12 in. from the body bolster, between it and head stock."

F. D. ADAMS (Boston & Albany): Add preceding Rule 1: "The number of cars of each road to be taken from Poor's latest Manual, and no vote will be allowed on cars owned by any private company." Define word printed in italics.

Rule 5: Careless inspectors should be dealt with. Rule 8: "Chipped" wheel should be "dangerous." Rule 13: Car may be sent home if safe. Rule 17: Private cars should plainly show who are responsible for repairs.

All these letters stated that all who take part in the revision of these rules should abide by the decision of the majority.

In the discussion which ensued, Mr. C. A. SMITH (Union Tank Line) stated that private companies had no vote at present. All wheels removed should be reported to owner of car.

Mr. GAREY: Railroads should have a vote on all cars maintained. Cards should be filled in with ink. Rules should be clearly expressed in simple language. A clearing house is advisable to avoid delay and secure uniformity. The general condition of cars is deteriorating. Incessant revision of rules is objectionable. The committee should obtain all the various objections to the rules and formulate revised rules accordingly. The revision could then be voted on at the convention. Wheel bills should simply show condition, marks and numbers of wheels removed and replaced, leaving each road to keep its own accounts in its own manner.

Mr. MARDEN (Fitchburg): Rules are now too complex. A better class of inspectors should be appointed. Rules should

be similarly understood by all inspectors. Some roads charge for every axle changed. The annual change in rules causes expense in preparing bills and forms.

The subject for discussion at the next meeting, Feb. 18, will be "Car paints and car painting, including repairs of cars by contract."

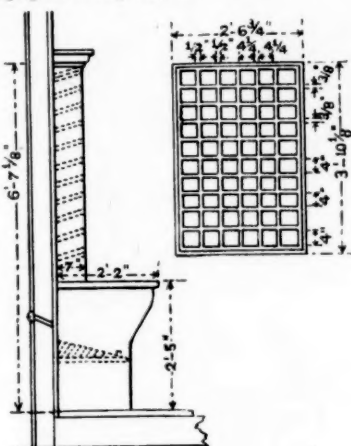
Foreign Technical Notes.

The locomotive engineers of Germany have a society, as ours do, and a magazine is published under its auspices, *The Locomotive Engineers' Magazine*, which is well filled with matter pertaining to the occupation, and is very much more of a technical character than the *Journal* published by the Brotherhood of Locomotive Engineers in this country.

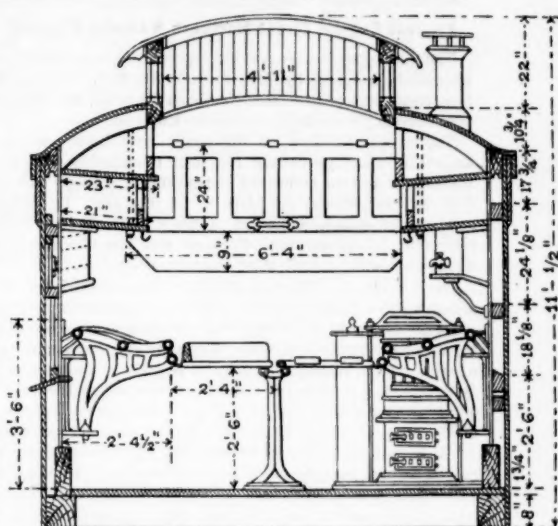
The German *Locomotive Engineers' Magazine* cites the following instances showing the great care necessary in putting on and using steam gauges, to avoid false indications, and showing the assistance rendered by the Schwartzkopf apparatus.

In one of the Prussian State Railroad shops two boilers in a battery of seven gave warning through the Schwartzkopf apparatus of low water when the glass showed water 2 to 3 in. over the danger level. The gauge was a glass one with the upper cock somewhat above the middle of the boiler, while above it a steam pipe was taken off. It was found upon investigation that with only from 38 to 45 lbs. pressure whenever the valve in this steam-pipe was open the gauge level rose by the above amount, and with heavier pressure and the throttle well open the water level in the glass rose to 4 in. over the proper indication.

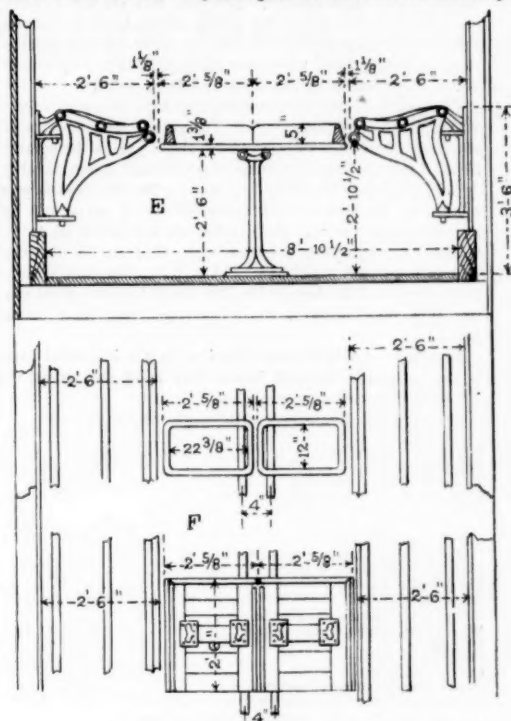
The other case was one where the boiler was entirely covered in by brickwork with the gauge connections built into it. A similar alarm was given by the Schwartzkopf apparatus with the gauge level 2 in. above danger. It was some time before careful investigation revealed the cause. This was a slight crack in the upper gauge connection through which the steam escaped in a fine cloud within the brick work, causing a difference in pressure between the top and bottom of the gauge glass of only 0.07 lb.



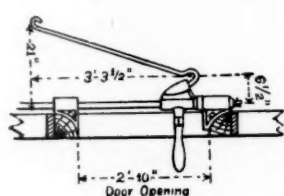
Letter Case with Stationary Table.



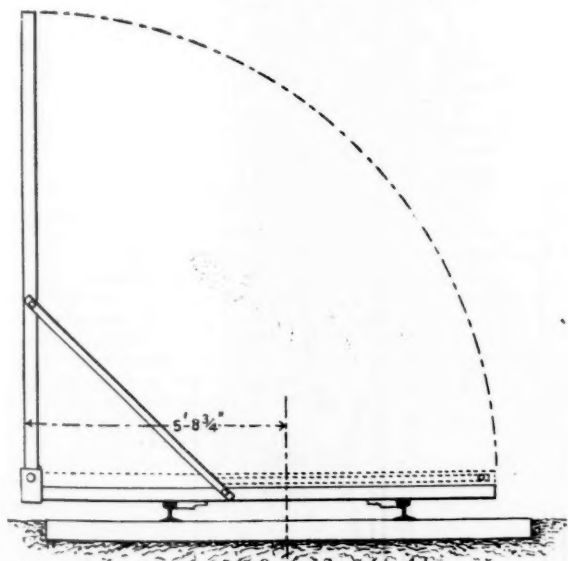
Cross Section CD showing Storage End of Car and Section through Window



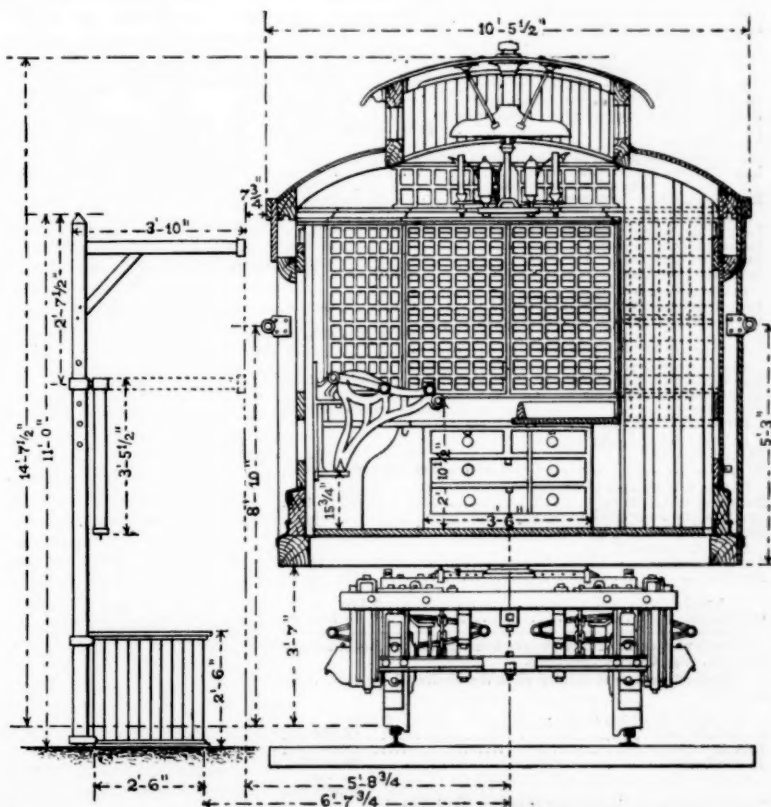
Details of Folding Racks and Tables.



Door Opening



Mail Crane Gauge.



Cross Section AB showing Letter Case - End of Car and Position of Mail Crane.

Details of Mail Crane.

THE HARRISON POSTAL CAR.

Express Engine Great Northern Railway, England.

The accompanying engraving represents a new class of engine lately designed by Mr. Patrick Sterling, Locomotive Superintendent of the Great Northern Railway, and built at that company's works at Doncaster, England.*

The express engines on this line have been very well known for many years both for their remarkably fine performances and for handsome appearance. A single pair of 8 ft. driving wheels, cylinders 18 in. diameter, by 28 in. stroke, and outside connected, a truck with 48 in. wheels, tubes only 1½ in. external diameter and the absence of a dome were some of their chief characteristics.

The *Railway Engineer*, to which we are indebted for the accompanying engraving and dimensions, says that the new engines are not intended to supersede the older engines referred to, the object being to provide an equally efficient engine at a lower cost of construction, and if possible of maintenance. Both classes of engines run the fast express trains, the fastest of which runs without stopping from Grantham to London, 105½ miles, in 1 hour 58 minutes, giving an average speed while in motion of 53.6 miles per hour. This is the fastest run in regular service of which we have any knowledge. The Chicago limited (which is not, however, the fastest train in this country) takes the same time, 1 hour 58 minutes, in running from Jersey City to Philadelphia, 89.76 miles, a distance 15¼ miles shorter. The best run on the Pennsylvania is, however, made by the 4 p. m. train which runs from Jersey City to Trenton, 55¼ miles, in 1 hour 4 minutes, or an average speed while in motion of 52.3 miles per hour, which is little short of the Great Northern speed.

The weight of the train and engine on the Great Northern run is stated to be 336,000 lbs. The maximum grade against the load is 26 ft. per mile, three of these grades being each about five miles long, the whole line undulating considerably. It will be noticed that, notwithstanding the length and speed of the run, the tender is carried on six wheels only, and has no pick-up apparatus. No dimensions are given as to the tender, but apparently the wheels are 49½ in. in diameter on tread, and the wheel-base is 14 ft. 0 in. The tank is about 20 ft. long by 4 ft. deep inside, but has a deeper central portion or "well" between the wheels and just clear of the axles.

The engine and tender are fitted with the improved form of non-automatic vacuum brake that is in use on all the Great Northern passenger equipment.

The principal dimensions of the engine are as follows:

Cylinders:
Diameter and stroke.....18½ in. by 26 in.
Steam ports, length and width.....16 in. by 1½ in.
Exhaust, length and width.....16 in. by 4 in.
Distance apart cyls. centre to centre.....2 ft. 4½ in.
Slide valve, maximum travel.....4½ in.
" lap.....1½ in.
" lead.....¾ in.

Wheels—Wrought iron centres:
Driving, diameter on tread.....7 ft. 7¼ in.
Front and hind, diameter on tread.....4 ft. 1½ in.
All tires, width and thickness.....5½ in. by 2¾ in.

Crank Axle—Siemens-Martin steel:
Wheel seat, diameter and length.....9¾ in. by 7 in.
Bearings, " ".....8¼ in. by 7 in.
Crank pin, " ".....8¼ in. by 4 in.
Centre, diameter.....7¾ in.
Crank webs, depth and thickness.....13 in. by 4 in.
Bearings, distance between centres.....3 ft. 11½ in.

Front and Hind Axles—Siemens-Martin steel:
Wheel seat, diameter and length.....7¾ in. by 6½ in.
Bearings, " ".....5 in. by 10 in.
Centre, diameter.....6 in.
Bearings, distance between centres.....6 ft. 3 in.

Frames—Siemens-Martin steel:
Inside, depth and thickness.....18 in. to 26 in. by 1½ in.
" distance apart.....4 ft. 1½ in.
Outside, depth and thickness.....13 in. by 7½ in.
" distance apart.....6 ft. 0 in.

Boiler—Siemens-Martin steel:
Height of centre from rails.....7 ft. 6 in.
Barrel, length and diameter outside largest plate.....11 ft. 5 in. and 50 in.
Thickness of plates.....¾ in.
Smoke-box tube plate (wrought iron) thickness.....¾ in.
Lap of plates, longitudinal seams.....3½ in.
" circumferential seam.....2½ in.
Rivets, pitch and diameter.....1¾ in. by ¾ in.

Fire-box Shell—Siemens-Martin steel:
Length and breadth outside at bottom.....74 in. by 48¼ in.
Depth below centre line of boiler.....5 ft. 6 in.
Front and back plates, thickness.....9-16 in.
Side plate, thickness.....¾ in.

Inside Fire-box—Copper:
Length and breadth at bottom inside.....65½ in. by 40¼ in.
Depth inside to bottom of mud-ring, front and back.....72¾ in. and 66½ in.
Top of box to inside of outside box.....18 in.

Tubes—Copper:
Number and outside diameter.....186 by 1½ in.
Length between tube plates.....11 ft. 9 in.
Thickness.....Nos. 11 to 13 B. W. G.
Placed in vertical rows ½ in. apart.

Exhaust Nozzle—Single:
Diameter.....4¼ in.
Height.....Level with top of top row of tubes.

Chimney—Cast iron:
Height of top from rails.....13 ft. 4 in.
Smallest diameter inside.....13¼ in.
Height of ditto from blast nozzle.....30 in.

Heating Surface:
Tubes (external).....1,001 sq. ft.
Fire-box.....109 sq. ft.

Total.....1,110 sq. ft.
Grate area.....18.4 sq. ft.

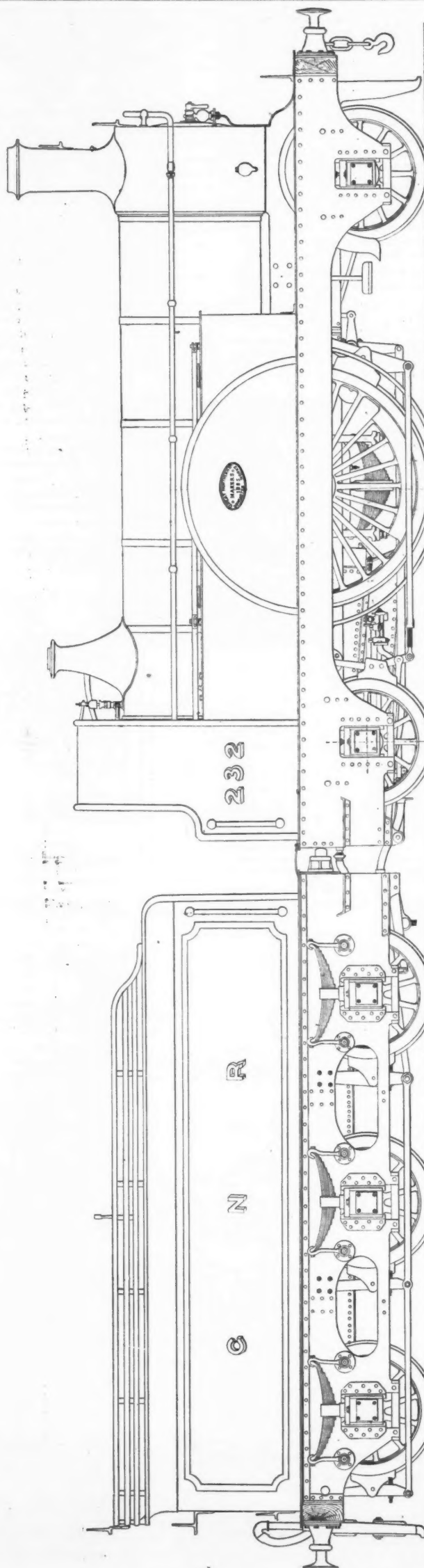
* Some particulars of these works were given in the *Railroad Gazette*, page 678, Oct. 23, 1885.

† These engines were illustrated in the *Railroad Gazette*, June 17, 1871.

Weight in Working Order:
Front wheels.....26,656 lbs.
Driving wheels.....38,080 lbs.
Hind wheels.....24,192 lbs.

68,928 lbs.
Traction force per lb. average pressure on pistons, lbs.....97.2

In comparing these engines with their predecessors it is useful to notice in what direction experience has shown changes to be desirable. The total weight of the engine is somewhat less, having been diminished by the substitution of a single pair of front wheels for a truck. The weight thu



EXPRESS ENGINE, GREAT NORTHERN RAILWAY (England.)

gained appears to have been devoted to increasing the diameter of the boiler barrel, the depth of the fire box, the area of the principal bearings and rubbing surfaces and the strength of the frames. The use of a straight dry-pipe without any dome is continued, but the steam space has been considerably enlarged by the distance between the top of the inside fire-box and the inside of the outside fire-box by some 5 in. Among other changes which do not affect the weight we notice that the internal diameter of the chimney is smaller and the blast nozzle lower than in the old engines. The proportions of the slide valve, the large lap and small travel of which contrast strongly with American practice, appear to have been but little altered, but the ports are longer.

Altogether the advantages gained do not seem to compensate for the disadvantages entailed by the use of inside cylinders and a crank-axle. It seems strange that the lesson taught by the Penistone accident, the most fatal of recent years in England, should be so soon disregarded. The great length of rigid wheel-base, 19 ft. 1 in., seems excessive, even on moderate curves, but the front axle boxes have some side play in the pedestals.

The Proposed Staten Island Bridge and Terminus.

The map herewith shows clearly the general character and location of the terminal facilities which the Baltimore & Ohio Railroad proposes establishing on Staten Island, and the approximate location of the proposed bridge over the Arthur Kill to connect with the main line. The precise location for the bridge has not yet been fixed, but it is expected to be not far from the point shown in any case. From the bridge, a line of 18 miles or less connects with the Bound Brook line at or near Bound Brook, which is 30 miles from Jersey City. In all, the proposed new line will have some 22½ miles of railroad and 6 miles of ferry in place of 30 miles of railroad and 1 mile of ferry.

The old Staten Island Railroad, shown running the entire length of the island in the southerly portion, has recently been leased to the Staten Island Rapid Transit Co., which latter has already built a line from the old terminus of the Staten Island Railroad at Vanderbilt Landing around the northerly point of the island to Port Richmond, only two miles from the proposed bridge crossing. In this last corporation the Baltimore & Ohio has acquired a controlling interest, and it has also secured several hundred acres at the most northerly point of the island, on which the proposed terminal works are to be situated, and from which the railroad ferry to New York is to start. It will be seen that on each side of this point there is still a very large amount of unoccupied water front, whereas on the Jersey shore there is very little, the long stretch from Constable's Hook to the Central Railroad of New Jersey ferry being flat land and shallow water, only available by costly improvements.

The New York terminus of the ferry has the very great advantage of being the best point possible for access by the elevated roads, but the very great disadvantage of being where there is no available unoccupied land or water front available for new uses. It is possible that this disadvantage may be overcome, in part, by erecting overhead structures over the existing ferry-houses, which are not controlled by opposing railroad interests.

Plans and working drawings for the proposed bridge have already been prepared, but pending authority to build the bridge are held in abeyance. The most plausible ground for opposition to the bridge is the large coal traffic which passes through the Kills from Perth Amboy, where the Delaware & Raritan Canal and two railroad lines bring in, as is well known, a very large tonnage, resulting in two or three times as great a tonnage through the Kill, it is stated, as the ocean tonnage which passes through the Narrows.

The Telegraph as Applied to Train Movement.

[From a forthcoming work by J. J. Turner, Superintendent of the First, Third and Fifth Divisions, Chicago, St. Louis & Pittsburgh Railroad.]

II.

(Copyright, 1885, by J. J. Turner.)

CHAPTER VI.—The Manner of Transmitting and Receiving Orders in Dispatcher's Office.—For identification, orders are numbered consecutively as they are issued, commencing with No. 1 each week or month, as found convenient.

In order to relieve the dispatcher of the purely mechanical work of receiving and checking orders as they are returned for verification, it is common practice to give him an operator, who sits at some convenient point where he can hear all that transpires on the wire, and manipulate the instrument. The dispatcher makes the entries on the train-sheet as trains are reported; he also sends the orders, but they are copied as sent by his assistant in the train-order book, with the address and signature. The subsequent steps are made by the operator, leaving the dispatcher's mind free to evolve new movements. In sending an order the way offices which are to receive it are first called, each being told how many copies to make; then the address to the train whose rights are to be curtailed should be transmitted, followed by the name of the station at which the order is to be delivered to the men in charge of said train; then the address and station of the trains whose rights are extended are sent, both being followed by the body of the order and the signature of the person authorizing the movement. In acknowledging the receipt of the order the operator holding the train first addressed responds first, followed by the others in the order named. By this means the receipt for the delivery to the train having the right to the track is in the possession of the dispatcher before any steps are taken with the others.

After all the offices have acknowledged receipt, any one of them may repeat his copy for verification, although it is preferred



MAP OF THE BALTIMORE & OHIO'S PROPOSED LINE TO STATEN ISLAND.

enable that the verification be made in the same order in which receipts are returned.

The verification is made by the operator at the way station repeating his order from number and address to signature just as he has written it, followed by his name and office call, the operator at the dispatcher's office underlining his copy in the train-order book as the words are received and recording the initials of the operator repeating.

If the copies are identical, the dispatcher, through his operator, informs the delivering operator, by some agreed abbreviation, of the fact and makes a record of it on his book, with the time at which verification was made. After all offices have verified their copies the order is ready for signatures or receipts of trainmen. These signatures are transmitted by the operators as the men sign, and, without regard to superiority, their names are written by the dispatcher's assistant in the train-order book opposite the order for which they sign. He then notifies the dispatcher of the names of the men and the number of train. If the order is still in force, the dispatcher assents to the delivery, and the response "Correct," with the exact time, is transmitted over the wire and recorded in the proper place.

In each step the operators at the dispatcher's office and at the way station give their initials, which are put upon the record, so that a complete check is kept of the whole transaction from first transmission to delivery.

CHAPTER VII.—The Forms in Way Offices.—The only forms required in way offices are a train-sheet and the blanks upon which orders are to be written.

Of course it is not necessary for operators at these points to keep a record of the time at which each train passes every point on the road. Their sheet, therefore, is provided with one blank space, in which is written the name of the station at which it is kept. Form D is a copy of one of these sheets as actually kept at a station in Indiana. It is kept in the same manner as the one in the dispatcher's office.

Train-orders are now almost universally written on manifold paper, which is prepared in tablets similar to ordinary scratch memoranda. By the introduction of sheets heavily charged with lamp-black and oil between the leaves, with a piece of tin or hard substance at the bottom of the number of sheets to be written upon, the writing on the uppermost is communicated to all the leaves by the stain left on the manifold paper where the pencil presses it against the carbon sheets.

Thus, when an operator is told to prepare for orders he is told how many copies to make. He prepares the tablet accordingly, adding one leaf to be retained as an office order. As the order is received over the wire all copies are made at the same writing, so that there is no possibility of discrepancy, and any one of them repeated for verification verifies them all. If additional copies are afterwards called for they should only be written by laying one of the verified ones on top of the additional number required and tracing the pencil over it.

The signatures of parties to whom orders are delivered are written upon the office copy.

[FORM E.]
PENNSYLVANIA COMPANY.
OPERATING DEPARTMENT.
Telegraphic Train Order No. 43.

Note "X response" here. Ray.
Superintendent's Office, Indianapolis, Ind., May 15, 1885.
To Conductor and Engineman
of No. 1, at Johnstown.

No. 52, Eng. 702, can have until seven forty five (7.45) p.m. to run to Paris for No. 1, Eng. 706. J. J. T.

Recd. 10.7 p.m. from J., opr., repeated by Ray, opr. OK'd 7.10 p.m.

Conductor.	Engineman.	Train.	Made.	At	By Supt.	Rec. by opr.
Stripp.	Revel.	No. 1.	Correct.	7.31 P.	J. J. T.	K.

Conductor and engineman must each have a copy of this order.

CHAPTER VIII.—Precautions at Way Stations to Insure the Delivery of Orders to the Proper Parties. The Train-Orders Signal.—The operator at a way station, by keeping

[FORM D.]

CHICAGO, ST. LOUIS & PITTSBURGH RAILROAD COMPANY.

TELEGRAPH REGISTER OF TRAINS, SECOND AND FOURTH DIVISIONS.

Peoria Junction Station. Month of March, 1885.

OPERATORS.		Date.	WESTWARD.	
Day.....	C. L. Jacobs.....	1	Train... 7 3.09 5.10 3.03 1.9 4.55 1.90 51 1.190 1.095 197 41 197 107 55 1.191 55	Ex. 4.09 5.40 7.54 8.05 10.40 11.31 12.20 6.02 7.22 8.50 9.10 9.15 10.47 11.27 11.53
Night...	A. Sturgeon.....	1	A 3.11 5.33 5.40 7.59 8.05 10.40 11.31 12.20 6.02 7.22 8.50 9.10 9.15 10.47 11.27 11.53	Ex. 4.09 5.40 7.54 8.05 10.40 11.31 12.20 6.02 7.22 8.50 9.10 9.15 10.47 11.27 11.53
Day.....	C. L. Jacobs.....	2	Train... 55 47 7 47 5 45 411 105 51 51 143 53 367 331 107 41 197 55	Ex. 2.22 3.14 3.48 6.40 7.11 7.22 8.43 11.15 11.25 12.17 1.25 3.29 6.41 7.31 7.45 9.17 10.00
Night...	A. Sturgeon.....	2	A 1.37 2.25 3.14 5.32 6.40 7.11 7.22 8.43 11.15 11.25 12.17 1.25 3.29 6.41 7.31 7.45 9.17 10.00	Ex. 2.22 3.14 3.48 6.40 7.11 7.22 8.43 11.15 11.25 12.17 1.25 3.29 6.41 7.31 7.45 9.17 10.00
Day.....	C. L. Jacobs.....	3	Train... 7 1.234 5 1.183 49 411 45 105 51 199 143 53 1.183 369 197 41 41 107 41 197 55	Ex. 4.14 4.52 6.37 6.58 7.02 7.47 10.14 11.07 11.50 12.00 1.56 2.56 6.45 7.21 7.26 7.31 8.15 10.37 11.20 11.37
Night...	A. Sturgeon.....	3	A 4.14 4.52 6.37 6.58 7.02 7.47 10.14 11.07 11.50 12.00 1.56 2.56 6.45 7.21 7.26 7.31 8.15 10.37 11.20 11.37	Ex. 4.14 4.52 6.37 6.58 7.02 7.47 10.14 11.07 11.50 12.00 1.56 2.56 6.45 7.21 7.26 7.31 8.15 10.37 11.20 11.37
Day.....	C. L. Jacobs.....	4	Train... 47 7 49 5 1.031 5 45 411 389 105 51 51 143 51 1.474 1 1.528 41 44 107 197 55	Ex. 2.32 3.28 5.58 6.33 6.50 7.20 7.28 8.13 9.33 10.53 11.50 12.16 12.32 2.00 2.59 5.57 6.10 7.46 10.25
Night...	A. Sturgeon.....	4	A 2.32 3.28 5.58 6.33 6.50 7.20 7.28 8.13 9.33 10.53 11.50 12.16 12.32 2.00 2.59 5.57 6.10 7.46 10.25	Ex. 2.32 3.28 5.58 6.33 6.50 7.20 7.28 8.13 9.33 10.53 11.50 12.16 12.32 2.00 2.59 5.57 6.10 7.46 10.25
Day.....	C. L. Jacobs.....	5	Train... 47 7 5 49 45 411 105 51 199 1.362 1.334 1.190 53 143 53 1 1.191 389 107 41 197 107 41	Ex. 3.25 3.15 6.32 6.42 7.22 7.22 8.20 9.33 11.02 11.19 10.32 12.34 11.25 12.58 1.40 1.55 4.03 2.23 2.50 2.55 5.30 6.00 6.30 7.30 7.42
Night...	A. Sturgeon.....	5	A 3.25 3.15 6.32 6.42 7.22 7.22 8.20 9.33 11.02 11.19 10.32 12.34 11.25 12.58 1.40 1.55 4.03 2.23 2.50 2.55 5.30 6.00 6.30 7.30 7.42	Ex. 3.25 3.15 6.32 6.42 7.22 7.22 8.20 9.33 11.02 11.19 10.32 12.34 11.25 12.58 1.40 1.55 4.03 2.23 2.50 2.55 5.30 6.00 6.30 7.30 7.42
Day.....	C. L. Jacobs.....	6	Train... 1.515 55 7 47 5 49 411 45 105 179 143 51 53 53 53 1 1.191 389 107 41 197 55	Ex. 12.57 12.57 2.55 3.20 3.35 6.40 6.55 7.48 9.58 11.55 12.11 1.37 1.44 2.00 3.22 4.00 6.21 7.27 7.10 10.05
Night...	A. Sturgeon.....	6	A 12.57 12.57 2.55 3.20 3.35 6.40 6.55 7.48 9.58 11.55 12.11 1.37 1.44 2.00 3.22 4.00 6.21 7.27 7.10 10.05	Ex. 12.57 12.57 2.55 3.20 3.35 6.40 6.55 7.48 9.58 11.55 12.11 1.37 1.44 2.00 3.22 4.00 6.21 7.27 7.10 10.05
Day.....	C. L. Jacobs.....	7	Train... 47 7 1.061 5 49 411 45 105 199 143 53 53 1 41 41 107 197 55	Ex. 2.37 3.00 1.061 6.37 7.00 7.10 7.40 9.37 11.0 2.48 3.16 4.53 7.05 7.10 7.57 9.40
Night...	A. Sturgeon.....	7	A 2.37 3.00 1.061 6.37 7.00 7.10 7.40 9.37 11.0 2.48 3.16 4.53 7.05 7.10 7.57 9.40	Ex. 2.37 3.00 1.061 6.37 7.00 7.10 7.40 9.37 11.0 2.48 3.16 4.53 7.05 7.10 7.57 9.40
Day.....	C. L. Jacobs.....	8	Train... 402 456 7 405 199 199 199 1.412 41 55 55	Ex. 12.29 2.20 3.22 7.23 10.52 12.45 1.35 1.43 7.10 9.46 1.00
Night...	A. Sturgeon.....	8	A 12.29 2.20 3.22 7.23 10.52 12.45 1.35 1.43 7.10 9.46 1.00	Ex. 12.29 2.20 3.22 7.23 10.52 12.45 1.35 1.43 7.10 9.46 1.00
Day.....	C. L. Jacobs.....	9	Train... 47 7 1.469 5 49 45 411 1.552 1.038 105 199 51 143 1.089 51 53 1.538 1 517 1.125 41 107	Ex. 2.00 3.15 4.27 6.32 6.45 7.37 7.48 8.00 8.52 9.00 9.30 11.15 11.16 11.32 11.55 1.02 2.59 2.32 2.51 3.30 6.23 6.15 7.27
Night...	A. Sturgeon.....	9	A 2.00 3.15 4.27 6.32 6.45 7.37 7.48 8.00 8.52 9.00 9.30 11.15 11.16 11.32 11.55 1.02 2.59 2.32 2.51 3.30 6.23 6.15 7.27	Ex. 2.00 3.15 4.27 6.32 6.45 7.37 7.48 8.00 8.52 9.00 9.30 11.15 11.16 11.32 11.55 1.02 2.59 2.32 2.51 3.30 6.23 6.15 7.27
Day.....	C. L. Jacobs.....	10	Train... 47 7 1.526 49 5 411 1.382 45 605 51 143 109 53 1 1.515 41 41 197 1.523 55	Ex. 2.15 3.15 1.526 6.12 6.35 7.30 7.33 7.44 9.28 11.18 11.33 7.44 9.28 11.18 11.33 1.31 3.26 5.52 8.03 10.30 10.32
Night...	A. Sturgeon.....	10	A 2.15 3.15 1.526 6.12 6.35 7.30 7.33 7.44 9.28 11.18 11.33 7.44 9.28 11.18 11.33 1.31 3.26 5.52 8.03 10.30 10.32	Ex. 2.15 3.15 1.526 6.12 6.35 7.30 7.33 7.44 9.28 11.18 11.33 7.44 9.28 11.18 11.33 1.31 3.26 5.52 8.03 10.30 10.32

OPERATORS.		Date.	EASTWARD.	
Day.....	C. L. Jacobs.....	1	Train... 44 10 158 Exa. 642 198 54 198 198 Ex. 325 150 56 56 158 158 Ex. 305 518 184 407 405 44	Ex. 12.30 12.51 1.45 4.07 2.15 4.00 4.00 6.10 7.21 11.00 11.08 5.15 5.55 5.55 6.07 7.00 7.35 7.35 10.10
Night...	A. Sturgeon.....	1	A 12.30 12.51 1.45 4.07 2.15 4.00 4.00 6.10 7.21 11.00 11.08 5.15 5.55 5.55 6.07 7.00 7.35 7.35 10.10	Ex. 12.30 12.51 1.45 4.07 2.15 4.00 4.00 6.10 7.21 11.00 11.08 5.15 5.55 5.55 6.07 7.00 7.35 7.35 10.10
Day.....	C. L. Jacobs.....	2	Train... 10 40 40 40 112 46 46 46 2 142 104 44 44 4 1.221 44 40	Ex. 12.52 1.32 4.55 5.07 9.42 12.22 12.28 12.31 12.39 1.35 5.37 5.55 6.24 7.22 11.10 11.15 11.20
Night...	A. Sturgeon.....	2	A 12.52 1.32 4.55 5.07 9.42 12.22 12.28 12.31 12.39 1.35 5.37 5.55 6.24 7.22 11.10 11.15 11.20	Ex. 12.52 1.32 4.55 5.07 9.42 12.22 12.28 12.31 12.39 1.35 5.37 5.55 6.24 7.22 11.10 11.15 11.20
Day.....	C. L. Jacobs.....	3	Train... 1.527 40 1.183 10 198 54 54 52 1.183 150 56 56 1 2 142 158 158 158 104 411 446 44	Ex. 12.10 12.30 12.50 2.28 3.05 5.30 5.35 7.45 8.40 8.50 9.24 9.34 9.38 9.43 12.08 1.50 2.40 5.20 5.35 5.36 5.51 6.26 7.12
Night...	A. Sturgeon.....	3	A 12.10 12.30 12.50 2.28 3.05 5.30 5.35 7.45 8.40 8.50 9.24 9.34 9.38 9.43 12.08 1.50 2.40 5.20 5.35 5.36 5.51 6.26 7.12	Ex. 12.10 12.30 12.50 2.28 3.05 5.30 5.35 7.45 8.40 8.50 9.24 9.34 9.38 9.43 12.08 1.50 2.40 5.20 5.35 5.36 5.51 6.26 7.12
Day.....	C. L. Jacobs.....	4	Train... 10 356 48 54 56 112 2 302 122 104 158 44 44 4 183	Ex. 12.50 3.40 4.15 6.25 7.14 9.39 12.12 2.40 4.00 4.42 5.15 6.55 7.02 7.21 7.42 10.35
Night...	A. Sturgeon.....	4	A 12.50 3.40 4.15 6.25 7.14 9.39 12.12 2.40 4.00 4.42 5.15 6.55 7.02 7.21 7.42 10.35	Ex. 12.50 3.40 4.15 6.25 7.14 9.39 12.12 2.40 4.00 4.42 5.15 6.55 7.02 7.21 7.42 10.35
Day.....	C. L. Jacobs.....	5	Train... 10 1.334 557 411 48 48 48 1.183 196 196 196 4.15 4.20 10.00 10.10 10.20 11.05 12.04 12.25 12.32 1.30 3.57 6.35 6.58 7.45 11.44	Ex. 12.38 1.10 1.35 1.40 1.57 2.45 3.00 3.00 4.15 4.20 10.00 10.10 10.20 11.05 12.04 12.25 12.32 1.30 3.57 6.35 6.58 7.45 11.44
Night...	A. Sturgeon.....	5	A 12.38 1.10 1.35 1.40 1.57 2.45 3.00 3.00 4.15 4.20 10.00 10.10 10.20 11.05 12.04 12.25 12.32 1.30 3.57 6.35 6.58 7.45 11.44	Ex. 12.38 1.10 1.35 1.40 1.57 2.45 3.00 3.00 4.15 4.20 10.00 10.10 10.20 11.05 12.04 12.25 12.32 1.30 3.57 6.35 6.58 7.45 11.44
Day.....	C. L. Jacobs.....	6	Train... 10 48 54 54 54 56 112 2 142 104 158 410 44 44 4 158 44	Ex. 12.59 1.07 7.05 7.14 8.04 9.12 9.26 9.41 12.07 2.15 4.37 4.55 5.28 6.55 7.23 7.57 8.02 8.10 8.27 8.50 11.00
Night...	A. Sturgeon.....	6	A 12.59 1.07 7.05 7.14 8.04 9.12 9.26 9.41 12.07 2.15 4.37 4.55 5.28 6.55 7.23 7.57 8.02 8.10 8.27 8.50 11.00	Ex. 12.59 1.07 7.05 7.14 8.04 9.12 9.26 9.41 12.07 2.15 4.37 4.55 5.28 6.55 7.23 7.57 8.02 8.10 8.27 8.50 11.00
Day.....	C. L. Jacobs.....	7	Train... 40 10 48 54 112 56 2 56 158 158 158 411 158 104 44 44 44 158 44 158 158 158	Ex. 12.37 12.44 2.40 3.55 10.15 11.58 12.07 12.17 6.41 6.00 6.05 6.06 5.30 5.35 6.39 6.45 7.10 7.20 7.18 7.25 8.47 9.10
Night...	A. Sturgeon.....	7	A 12.37 12.44 2.40 3.55 10.15 11.58 12.07 12.17 6.41 6.00 6.05 6.06 5.30 5.35 6.39 6.45 7.10 7.20 7.18 7.25 8.47 9.10	Ex. 12.37 12.44 2.40 3.55 10.15 11.58 12.07 12.17 6.41 6.00 6.05 6.06 5.30 5.35 6.39 6.45 7.10 7.20 7.18 7.25 8.47 9.10
Day.....	C. L. Jacobs.....	8	Train... 40 40 325 456 196 10 1.555 56 56 56 56 517 141 946 456 492 456 1.038	Ex. 12.15 12.20 1.45 4.35 3.45 6.18 8.40 3.07 3.25 3.35 3.50 7.10 7.25 7.53 7.58 9.21 10.21 15.55
Night...	A. Sturgeon.....	8	A 12.15 12.20 1.45 4.35 3.45 6.18 8.40 3.07 3.25 3.35 3.50 7.10 7.25 7.53 7.58 9.21 10.21 15.55	Ex. 12.15 12.20 1.45 4.35 3.45 6.18 8.40 3.07 3.25 3.35 3.50 7.10 7.25 7.53 7.58 9.21 10.21 15.55
Day.....	C. L. Jacobs.....	9	Train... 10 1.014 1.111 1.080 1.081 198 198 112 150 2 46 104 158 411 4 455 44 40	Ex. 12.55 1.25 1.55 2.30 6.00 6.35 6.45 9.50 11.00 1.00 2.23 4.00 5.30 6.15 7.18 7.58 8.45 10.47 10.47
Night...	A. Sturgeon.....	9	A 12.55 1.25 1.55 2.30 6.00 6.35 6.45 9.50 11.00 1.00 2.23 4.00 5.30 6.15 7.18 7.58 8.45 10.47 10.47	Ex. 12.55 1.25 1.55 2.30 6.00 6.35 6.45 9.50 11.00 1.00 2.23 4.00 5.30 6.15 7.18 7.58 8.45 10.47 10.47
Day.....	C. L. Jacobs.....	10	Train... 10 1.447 48 54 54 54 198 1.334 52 52 112 150 142 46 2 158 104 1.469 411 44 4	Ex. 12.45 1.57 2.52 6.00 6.07 6.12 6.35 7.30 8.15 8.29 9.58 11.35 1.00 12.05 12.07 3.25 4.27 4.20 6.35 6.28 7.18
Night...	A. Sturgeon.....	10	A 12.45 1.57 2.52 6.00 6.07 6.12 6.35 7.30 8.15 8.29 9.58 11.35 1.00 12.05 12.07 3.25 4.27 4.20 6.35 6.28 7.18	Ex. 12.45 1.57 2.52 6.00 6.07 6.12 6.35 7.30 8.15 8.29 9.58 11.35 1.00 12.05 12.07 3.25 4.27 4.20 6.35 6.28 7.18

REMARKS.

posted as to trains passing the next station on either side, can nearly always be sure of the identity of any train approaching his station; but if he is not sure he must, when he has orders for any train, stop all trains from the same direction as the train for which he has orders, and ascertain positively that they are no: the one he wants before allowing them to proceed.

The greatest danger, however, is not that the train will not be recognized, but that it will be (from other causes) allowed to proceed without the orders. The most frequently occurring of these has been the falling asleep of an operator; the other is the failure of a light, or the obscuring of a flag after being put in position.

These difficulties can both be overcome by a train-order signal made stationary to the building, or on a pole where it is plainly visible; its normal position made by gravity, or a spring to indicate stop. Gravity, because of its constancy, is to be preferred for the purpose. It should be arranged so that it can be pulled to safety from the office only, and so that it cannot be fastened in that position. Then with a rule to trainmen that the absence of any signal at the point where this signal is usually displayed, shall be notice to stop and get orders; if the operator goes to sleep, trains are held by the signal remaining at danger, and none get by until he is awakened. At night, if the light of the signal blows out, its absence stops the train.

The best form of train-order signal is the one called the semaphore, which consists of an upright post elevated a sufficient distance to give a good background, and having extended at each side, at its top, a blade. These blades are counterbalanced so that, unless held otherwise, they will stand at right angles to the post, and crosswise with the track.

The form of the signal may be likened to a gigantic man, standing with his arms extended warningly; if he desires an approaching train to proceed, he drops the arm governing traffic from that direction; but if it is to be stopped the arm is allowed to remain extended. The blade to the right of the

pole, as the train approaches it, should govern movements from that direction.

At night a red light is automatically displayed when a blade is horizontal, or set for danger, as it drops to safety, the color changing to white.

These signals should be worked from the office only, and should be changed in sight of the engineer, so that he may not only know that there are no orders for him, but that he may be inspired with the confidence which comes with seeing that those who have his safety in their keeping are awake and alert. It is possible that a sleepy operator suddenly roused and seeing a train brought to a stand-still by his neglect, will, before he is thoroughly awake, change the signal to safety. In this way a train for which he has orders may be allowed to proceed. To guard against this a rule should be enforced that a train once brought to a stop by an order signal may not proceed without written notice from the operator that there are no orders for it.

To provide against all possibilities of failure, operators should keep other danger signals ready for immediate use. This may seem a useless precaution, but it is better to be provided with too many signals of danger one thousand times than to have too few but once.

CHAPTER IX.—Abbreviations which may, with safety, be used.—The results of misunderstanding of train orders would be so disastrous that no abbreviation which can, by any possibility be misunderstood, should be used.

Abbreviations for technical terms which are in daily use, such as "Eng." for engine, "No." for number, "C. and E." for conductor and engineer, are perfectly safe; but beyond this abbreviations should be prohibited.

In naming the time as given in a time-order, it should always first be written, then duplicated with figures. Of course, the time noted on orders for purposes of record need not be duplicated.

CHAPTER X.—Precautions necessary to insure the recognition of trains running against each other on special order.

It is essential that men in charge of a train, whose rights have been curtailed in order that some other train may be moved against it, shall be able, without doubt, to recognize this train. In all other cases where men are running under orders it is best that they should be able to know positively when they have met the trains in regard to which the order directs their movement.

Time is too valuable an element to permit of the traffic stopping while men inform themselves of the identity of each other's trains; neither is it safe for men to assume that a certain train is the local freight because it has a combined car in the rear, which is the usual make-up of the local; nor to make the assumption on the fact that Tom or Bill usually runs this train, or because the way cars are in it. In short, the make-up of the train or the personnel of the crew is no index to its identity. The number of any train may be changed by the dispatcher at any time, and for reasons entirely foreign to its class of lading.

Upon roads where the train is not required to carry its number or name displayed upon it, the only means to meet the requirement is for the dispatcher to give the number of the engine in all orders.

The engine number can always be seen, and answers the purpose admirably, excepting where it becomes necessary to change the engine after orders have been issued, and too late to notify the opposing train by telegraph. In cases of this kind, nothing remains to be done but for the train upon which the engine has been changed to stop and give verbal notice of the change to all trains holding orders in regard to it.

A New Bearing Metal.

A new bearing metal, "glass composition," has been introduced by Mr. Louis Dill, of Frankfort-on-the-Main, and has been much used in Germany. It is said to possess the qualities of the best composition used for bearing surfaces, and to contain a trifling percentage of a vitreous substance sufficient to impart to the alloy a durability and uniformity not hitherto

reached. Even at a high rate of speed the heating of journals is said to be avoided, and their unequal wear prevented. Moreover, the first cost of the composition is reported to be less than that of alloys of equal efficiency at present in use; and it is finally said to stand wear remarkably well, even with a small amount of lubrication, and to be proof against atmospheric influence and the action of dilute acids.—Iron.

Contributions.

Large Steel Plates.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I see in the notice of the Calumet & Hecla locomotive in the *Gazette* that the reason assigned for putting two horizontal seams in one boiler ring is that plates large enough to go around the boiler cannot be obtained. Plates are now being rolled in this country to go clear round a 90-in. stationary boiler. The plates are $\frac{3}{8}$ in. thick and 71 in. wide. I understand that the Otis Steel Company is prepared to furnish plates 100 in. wide, and 30 ft. or more long, $\frac{3}{8}$ in. thick.

WINTHROP CHARD.

A Lumber Railroad after Passes.

Chicago, St. Paul, Minneapolis & Omaha Railway Co.,
St. Paul, Minn., Jan. 23, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The inclosed copy of circular issued by S. H. Davis, Manager of the Cady Mills Railway Co., represents a lumber tramway about 8 miles in length, over which materials are transported to and from a side-track of the Chicago, St. Paul, Minneapolis & Omaha Railway Co. It is not a branch of this railway, and the use of its title as herein shown is without authority.

E. W. WINTER, General Manager.

[COPY.]

"Manager's Office, Cady Mills Railway Co.,
"Branch C., St. P., M. & O.,
"Cady Mills, Wis., Dec. 31, 1885."

"DEAR SIR: I respectfully request annual passes for the year 1886 for the following officers of this railway: D. C. Davis, President; S. H. Davis, Manager; A. B. Clarke, General Freight and Passenger Agent.

"I shall be pleased to respond to similar request from you.

"Yours truly,

(SIGNED) "S. H. DAVIS, Manager."

Three-Track Bridge Strains.

BETHLEHEM, Pa., Jan. 23, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Please answer the two following questions through your columns:

1. In a three-track railroad bridge, will the greatest stress in the chords be produced by having all three tracks covered with cars?

2. In same truss, will the greatest stress in the web-members be produced by having locomotives followed by cars simultaneously enter the bridge up to the particular panel-point which corresponds to the web-member, the stress of which you want to find; or is there some arrangement of trains with respect to each other which will give a greater stress in the web?

J. H. B.

1. Yes; with locomotive loads in the middle of the span.

2. Yes.

3. No; except as the irregular loading and spacing of the locomotive wheels may vary the precise point at which the locomotive should stand to give most stress in the web. Usually the load on truck projecting beyond the panel-point is neglected.—EDITOR RAILROAD GAZETTE.]

Subordination to the Division Superintendent.

TO THE EDITOR OF THE RAILROAD GAZETTE:

When I wrote my first letter, which you published Dec. 4 last, I fully expected there would be a "kick" from some motive power man, but did not expect that the roadmaster element would fly off the handle, so to speak, in their anxiety to protect the interest of their brethren in arms. In fact, I am not thoroughly satisfied now, after reading the letter signed "Roadmaster" in your issue of Jan. 1, that the title is an honest one. Possibly I am doing the writer injustice; if I am, I apologize. For his information I beg to state that the General Master Mechanic referred to in my letter did possess ordinary intelligence, and that while the Superintendent of Motive Power to whom I referred had a secretary, he had no assistant at his office, and the secretary was not authorized to assume any authority; which can be easily understood from the fact that as my letter, I think, says that Superintendent of Motive Power was in the habit of deputizing no one to assume any authority for him under any circumstances. The General Superintendent did not care to advertise the fact over the wires that the Superintendent of Motive Power was off in the woods fishing, or on some such errand, and simply used the expression "inspecting cars" for want of a better name. Possibly, when "Roadmaster" is older he will understand such things better, and also understand that it is quite possible, even if officers are not off on their well-earned holidays, that they are frequently out of the reach of wire communication for hours at a time, as far as any knowledge of whereabouts is known to their brother officers; and that in cases of emergency like this, engines are needed so quickly that you would take the ones then in service. There is a little bit of sarcasm in his reference to bridges and buildings being left out of the list. I beg to call his attention to the fact that I left out many things—culverts, joints, splices, fences, water and coaling stations—for the simple reason that

I was writing in a general way, and I believe most railroad men who cared to read the letter so understood me. I will now say that I did mean that everything connected with the division, even down to taxes and general political matters, should be in the Division Superintendent's hands.

Now we come to his greatest effort, "That the man who controls any work should know at least as much about it as those working under him, otherwise his men will impose on him." "Superintendent" does not dispute this by a large majority, and the main object in the former letters written by me was to lend all the assistance I could to the system of properly educating officers to wipe out the existing shortcomings as far as possible. My young friend will learn in time and by investigation on his part that the various large roads in the country, especially the most successful ones, have tried his plan and many others of the same nature, but have gradually come to about the ideas I have suggested, for many reasons, but particularly for the important reason that nearly every time the three departments have been separated, the motive power and engineering or maintenance of way departments have made sad failures of their share, not so much in lack of improvements, etc., as in expenses and other troubles. This came from two causes: a visionary idea of the requirements of the road, and a lack of just knowledge as our young friend has endeavored to lead us to suppose his craftsmen possess. I will venture to say that there is not one old and experienced railroad officer who has been, and is still, a successful man in his line who would allow the average Assistant Engineer or educated Roadmaster to meddle too much with the practical handling of his track foremen and men by his time-honored and much-respected supervisor; because as a rule, these supervisors, if what they should be (and there are plenty of them), are the real backbone of the practical good results that have produced the present high standard of track. I say high standard because on many good roads the standard has been brought up to a high point in excellency. Now the Assistant Engineer and educated Roadmaster have done their share and deserve credit for their portion, that of designing; but beyond that they are as a rule powerless, as most men who have had them know. The Mechanical Engineer or Superintendent of Motive Power as a rule is a gentleman of the same school, and how often would his ideas be worth anything if he did not have his practical foreman or machinist to assist him out? How often have these men designed splendid structures in iron that they could not make work satisfactorily or as they were intended, until some member of their official family, possibly a foreman, possibly an engineer, got him to make a few changes in valve lap or draft or some little point, but one young fully educated and all-powerful Superintendent of Motive Power could not catch on to, to save his life, even if he has been through the shops. I don't want to be misunderstood in this matter. I do not mean any unkind criticism upon these men. They are needed, and have done wonders in their lines; but they are not the people our friend would lead us to suppose, and they are no more competent to handle bridges and buildings, or shops and engines, as far as the actual labor is concerned, than an ordinary division superintendent, who, while he cannot draw and calculate, has by his years of experience gained a great many points and possibly better judgment about most matters connected with railroading. His position should be a certain guarantee of his ability generally, while, if his assistants in the motive power and roadway line should be old men, in most cases the lack of good judgment or want of education has detained them in their present position. I think most railroad men will agree with me that there must be a common head for all somewhere. Our friend's rule of general separation may as well go through to the end, and take in General Manager, Vice-President and President, winding up with a President of the maintenance of way department and one for the motive power also, having no connection whatever with the President of the road, as we now understand that gentleman's duties.

Surely these men who are now filling the higher positions should have no control of such matters. They are lawyers, and men who have risen from the ranks of division superintendents, as a rule; therefore are not capable of judging what should be expected of such an expert class as the motive power and maintenance of way men. As to where the present superintendents of divisions come from, I do not think is a proper subject to bring into this argument. They are there. If they are not educated engineers, that is no fault of theirs. They have by hard work and close attention to their many responsible duties gained the confidence of their superiors, and are trusted as managers by the owners, doubtless for the reason that they are the best that have offered. They are there, and my engineering brothers are not. That cry always reminds me of the man who plays cards and loses, and wants the railroad officer to get his money back. I have little sympathy for such; they don't deserve it. I have full right to speak as I do, being an engineer, or part of one, and what I am anxious to do is to get our young engineers into line, where they may be of service, and not set back and howl because the "practical man," as they call him, be he whatever he may (telegraph operator or clerk), has, with less advantages than they have had, had common sense enough to bag the game. Don't abuse him; that is babyish. Look at yourself and see what you can do to replace him with a better man from your own class. This is the only way you can win.

I beg also to call the attention of my friends to one point of great importance. This is not the age of men proficient in one or a few branches of work outside of their own class. The engineers have by common consent acknowledged that, if you want a bridge, you must not ask your Roadmaster or Assistant Engineer, but must go to a bridge engineer or firm,

and really depend on them for your safe bridge. Who is the most capable judge, a fellow with years of experience or some youth just out of college or with a few years' service on track? My plan brings the experience of the older officer, the Superintendent, into direct intercourse with the Chief Engineer. That pair will take a pair made up of Assistant Engineer or Roadmaster and Chief Engineer every time.

Our friend admits that they should come into one centre at either the General Superintendent or General Manager, who should be a man of sound practical knowledge. Now I claim my plan is better. I want just such a man on each division, and while I am far from saying we don't have them now, I know by the experience of others and the results such roads as the Pennsylvania Railroad have produced, that my plan is the only way to improve what we have. As to discipline and economy, they are the very causes that have broken up the idea or system advanced by "Roadmaster."

It was impossible for any one to make enough money on a road this side of the water to pay the bills of the civil and mechanical engineers when left alone to themselves, when they had not received a thorough railroad education in addition. If they have that, they should be the

SUPERINTENDENT.

TECHNICAL.

Iowa Society of Civil Engineers.

The Iowa Society of Civil Engineers was organized at Cedar Rapids, Ia., Jan. 15, with 14 members. The officers are C. W. Irish, of Iowa City, President; C. F. Macdonnell, of Cedar Rapids, Vice-President; A. W. Swantz, of Cedar Rapids, Treasurer; H. F. White, of Cedar Rapids, Secretary. The next meeting will be held at Cedar Rapids March 17 next.

Engineers' Club of St. Louis.

This Club met in St. Louis, Jan. 6. President McMath in the chair; 20 members and 4 visitors present.

The standing committee on National Public Works reported as follows:

"Your Committee on National Public Works to which was referred a motion to approve the action of the Convention of delegates from Engineer Societies held at Cleveland Dec. 3, 4 and 5, 1885, respectfully reports that, after due consideration, it was decided not to be expedient at the present time to indorse or disapprove the action at Cleveland. We therefore recommend that no action be taken on the motion.

"We have further considered the question of expense attending our work as committee, but are not able to form an estimate of cost, which will be limited to postage and stationery until report is made and the sanction of the club obtained."

This report was accepted.

An amendment to the by-laws was adopted, making annual dues \$5 for resident and \$4 for non-resident members.

Mr. J. A. Seldon read a paper on "Some considerations of the Relation of Bed to Variables in River Hydraulics," which was discussed by Messrs. Moore, Ockerson, Johnson, Johnston and others. The club then adjourned.

Western Society of Engineers.

The 220th meeting was held in Chicago Tuesday, Jan. 5, Mr. Cregier in the chair.

Mr. Charles E. Billin and Mr. Maurice Seifert were elected members.

Mr. Cooley, for the Committee on the Organization of the Engineer Service for the Conduct of the Public Works of the United States, reported at length, recommending that "in place of the present committee a permanent Committee on National Public Works be appointed, whose chairman shall be a member of the Civil Engineers' Committee on National Public Works."

The annual report of the Secretary was read, accepted and adopted.

Officers were elected as follows: President, A. W. Wright; First Vice-President, C. H. Hudson; Second Vice-President, D. J. Whittemore; Secretary, L. P. Morehouse; Treasurer, Charles Fitzsimons; Librarian, G. A. M. Liljencrantz; Trustees, S. G. Artingstall and A. Gottlieb.

A vote of thanks was tendered to the Association of County Surveyors and Civil Engineers of Indiana, for an invitation to attend the annual meeting at Indianapolis, Jan. 19.

President Wright took the chair, introduced by Mr. Cregier and made a brief address.

The Committee report presented by Mr. Cooley was taken up for discussion. Mr. Cooley read a paper (to be printed), and after a full discussion the recommendation of the report was adopted.

At request of Mr. Irish the general interests of the Society were informally discussed. It was understood that the board of trustees should give this matter consideration. The Society then adjourned.

An American Bridge for New South Wales.

A cablegram from Sydney, Australia, announces that a contract has been signed between the Government of New South Wales and the Union Bridge Co., of New York, to construct a bridge 3,000 ft. long across the Hawkesbury River. This bridge is a double-track railway bridge, consisting of seven spans of 415 ft. each, resting upon stone piers. The foundations, which are to be of concrete in iron caissons, are to go down to the unprecedented depth of 170 ft. below tide. The contract calls for the doing of this in 2½ years, and for a sum not much over one-half of the original estimate of the cost of \$3,000,000. The Union Bridge Co. obtained this contract in consequence of two things—first, American bridge manufacturers have learned, notwithstanding the higher rates of wages in this country, to construct bridges at a less price per pound than they can be built in Europe; secondly, the plans of the Union Bridge Co., particularly as respects the foundations, were decided by a commission of the most eminent civil engineers in England to be the best among the 16 competitive designs submitted. Americans have been treated in this whole competition with great fairness, both by the New South Wales Government and by the English engineers who acted as judges.

Freight Brake Tests.

The Committee of the Master Car-Builders' Association, who are appointed to consider the above question, have issued a circular addressed to all the State Railroad Commissioners throughout the country informing them of the conditions of the forthcoming tests at Burlington, Ia., on July 13 next, and requesting any suggestions as to the tests to which the various brakes should be subjected. Mr. G. W. Rhodes, Superintendent Motive Power Chicago, Burlington & Quincy Railroad, Aurora, Ill., is the Chairman of the above committee, and all communications in reference to the matter should be addressed to him.



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

COUPLING IN A VERTICAL PLANE.

Few attentive observers of the coupler question can have failed to detect that one of the greatest, if not the greatest, of the immediate obstacles to an early settlement of the coupler question is that, numerous as are the couplers competing for public favor, those which have attained any prominence may all be divided into two great types, each having strong, numerous and sincere advocates, and yet each type differing from the other type so radically that no compromise between them is well possible. There is not the slightest probability that any one particular patent will ever attain exclusive use—certainly not for a long time—nor is it necessary that it should, to settle the question, for as between the different couplers of the same type there are in each case four or five at least which, if any one of them were generally adopted or recommended for adoption, would either couple automatically with the favored one as they stand, or could and would be at once so modified as to do so. Thus, the largest immediate difficulty—possibly the only one of moment—is to secure the general acceptance of one or the other of these types. The rest will be very apt to follow naturally, for no one coupler can successfully impede progress by attempting to establish a monopoly, even if it were given such preference as to be the only one of that type recommended by name, with the addendum sure to be made to any such recommendation—"or such as shall couple automatically with it, and equally well with common draw-heads." In all probability not even this much indorsement will ever be given officially to any one coupler, and it is to be feared, not even to any one type.

To define either one of these types in a word is not easy, and it is not surprising that a dismal failure should have been made of the only attempt to do so. The two types may be defined broadly as

(1). Those which have a hook or some equivalent which moves laterally, or in a horizontal plane, in coupling, like the Miller passenger coupler, and hence would or might have their surfaces in contact in a vertical plane, whence the name "vertical plane coupler," and

(2). Those whose parts move up and down in act of coupling, or in a vertical plane, like the pin of a link coupler, commonly distinguished, however, not as horizontal plane couplers (which would be a term without meaning in their case) but as of the link type.

More intelligible and appropriate designations of the two types would probably have been to reverse the names given—to call the first type horizontal plane couplers, or those whose motions in the act of coupling are in a horizontal plane, and the other the vertical plane type, and this is the sense in which they are commonly interpreted by those who hear them for the first time; but the term "vertical plane" coupler, for the first type, is now well established.

Since a practical agreement on one or the other of these types is the first great step to a settlement of the whole question, if not the last one also, it becomes

every one concerned to consider as fully and as carefully as possible which of the types is, under all the circumstances, mechanically best fitted for adoption, in order to help along that drift of events which is probably the only rational hope of a final settlement and decision. Signs are not wanting that the question may possibly be practically settled in this way much sooner than is generally expected, for action of some kind is multiplying, and slight causes in the beginning change the direction of progress to one side or the other.

It is perhaps still too early to speculate as to which type even present tendencies seem to favor, but any tendency toward either of the two types, if only it be decided and continuous, is to be hailed by all disinterested persons as a fortunate result. The practical railroad man may well cry, with Captain Macheath in the old song—

"How happy could I be with either,
Were t'other dear charmer away!"

It certainly has not been, and probably cannot be shown to the satisfaction of practical men that either type has sufficient advantage over the other to make it anything but a fortunate circumstance if it were sunk in the sea and forgotten. The field would then be clear for what would almost certainly be a speedy decision, even if it were not ideally the best decision.

The desirability of some decided drift in one direction or the other was perceived some time ago by some prominent members of the Master Car-Builders' Association, who favored the "vertical plane" type, and at the Saratoga (June, 1884) convention of that body a resolution was proposed and, in form at least, passed unanimously, that "the best coupler mechanically is one which performs the coupling along a vertical plane." The subsequent course of that body has shown, however, as was clear at the time to all those who listened to the discussion, that if the words "best coupler mechanically" were to be interpreted in a practical sense, as meaning that the type was the one which, under all the existing circumstances, offered such decided advantages that no other type should thereafter be considered, the vast majority of the Association did not believe anything of the kind, for but few of them had formed decided convictions of any kind on the subject. It was therefore, in a sense at least, unfortunate that the resolution should have passed in the form it did, for it had an appearance of committing the body of the Association to views which it now clearly appears they were not, as a body, prepared to accept. The only resolution which would have really been a step in advance, would have been something to the effect that it was "the sense of the Association that, under all existing circumstances, the vertical plane type of coupler (or the other, as the case might be) was so much better adapted to fulfill the practical mechanical requirements that it was inexpedient to experiment with couplers of any other type." The resolution at first proposed was almost equivalent to this, but, whether because it appeared that a resolution in that form had little chance of passing, or for some other reason, it was abandoned in favor of the more abstract declaration, the obvious objection to which is that, if it means as much as the other, it should have said so, and if it means by "the best mechanically" anything less than "the best practically," it is little to the purpose.

Suppose, to illustrate the difficulty, a body of engineers were debating what line should be adopted for a railroad, and, to assist to a solution, some one should move a resolution like this:

"Resolved, That the best railroad line, mechanically, is that which has the easiest grades and fewest curves."

The obvious answer to such a resolution is that, in so far as it is true, it is not pertinent, and that, in so far as it is pertinent, it is not true. The question to be decided is not an abstract one, as to what railroad line might, could, would or should be best in some ideal state of things, but as to what line is best under all the circumstances of the existing situation in the given particular case.

It may indeed be claimed that the parallel is not exact, because every one knows, abstractly, that as between a straight and level line and grades or curves the former is the best, whereas every one does not know which is the best type of coupler even abstractly; and that supposing this elementary principle to be unknown, the first step in the instance supposed is to lay down a general principle to guide a choice.

But this exception is not valid. Supposing engineers to be engaged in choosing between alternate lines with such an ignorance of the fundamental principles which should guide a choice as that assumed; what is the first rational step? To lay down first a general principle? Not at all; but rather to proceed to determine with such care as they can, from such

light as they have, what is the best thing to do in this particular case. After having done this a sufficient number of times, they may then reasonably proceed to the further step of laying down a general principle; but if a man cannot tell what is best to do in the existing situation, which he has seen, how can he tell what is best to do in some ideal situation, which he has not seen, and which, so far as he knows, does not and never will exist?

So it is with the coupler question. "The best coupler mechanically" is that which, under all the existing circumstances of the actual situation, will best fulfill practical requirements. If that is once determined, any consideration whatever of other types is inexpedient. If that is not determined, the passage of resolutions as to what might, could, would or should be the best coupler under some situation which does not exist—as, for instance, if no period of transition from the common link coupler were to be considered, or if there were no interchange of cars, or if there were 6 or 8 in. instead of 3 or 4 in. difference in the height of draw-bars of the cars largely interchanged—will not be likely to help materially to a decision; nor does it appear to have done so in the case of the resolution as passed. Had the resolution as first proposed, "that any automatic coupler presented here should couple in a vertical plane," been passed by the Association in a deliberate and well-considered way and with eyes open, it would have been a fortunate circumstance, and we should probably be much further advanced toward the end. As modified into a declaration of abstract principle, and passed, it has since been persistently disregarded, and the Association has in its later action preserved an attitude of strict impartiality between the two types, as was its duty to do until it could come to some more definite agreement than was involved in the resolution.

Therefore, the vital question of which type it is most expedient to select from a practical point of view still remains practically unacted on officially (for all state action as well as the Master Car-Builders' Association has dodged a decision of this vital question). The drift of events is alone tending to settle it, if even that is, which cannot be asserted. This is to be regretted, for we believe that, as already stated, all reasonable, unbiased men who have studied the situation, would hail with the greatest satisfaction any decided tendency toward either type which would put the other completely out of the game. However much interested or biased advocates may urge that their type alone should be adopted, this result alone, we believe, is what disinterested men, who desire only the public good in this matter, are very anxious to see come about; and as it is not likely to come about except as an increasing number of men fall in with the view that this or that type is the one which either ought to be or will be generally adopted, it may help toward that very desirable end to consider, in an entirely unbiased and (so far as is possible) strictly impartial manner, what are the mechanical merits of the two types of couplers, not in the abstract, but under all the circumstances of the existing situation. This we cannot attempt now, further than to say—what almost goes without saying—that neither of the types can be rationally claimed to have all the arguments on its side, or even a very heavy preponderance.

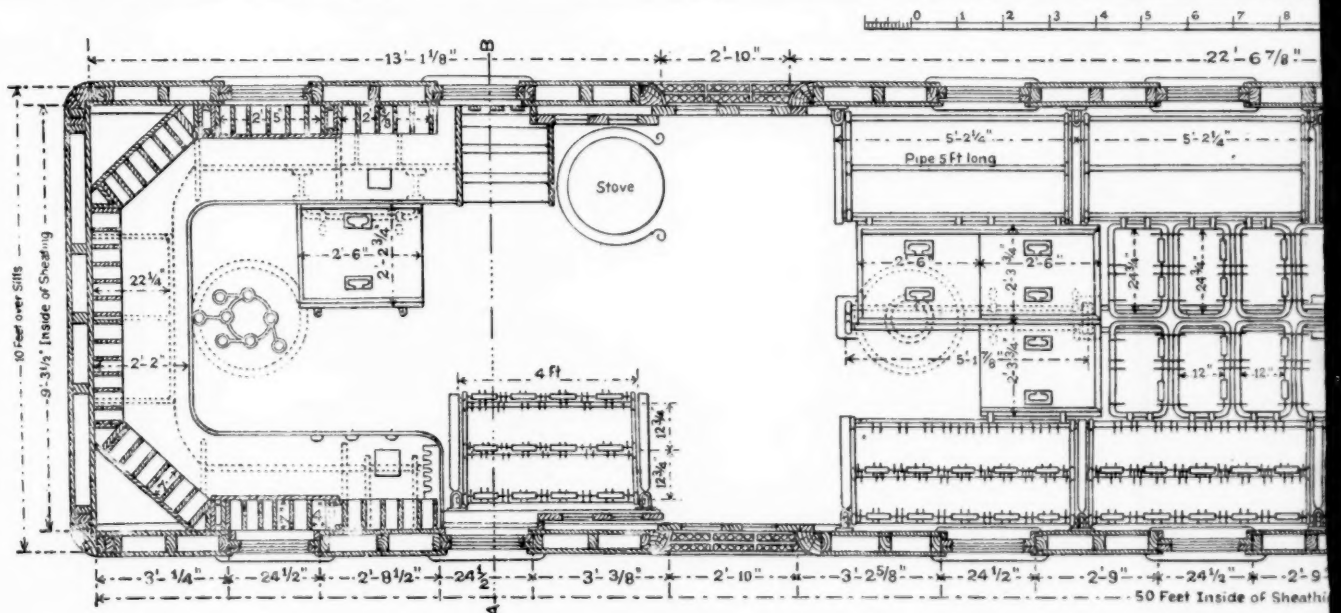
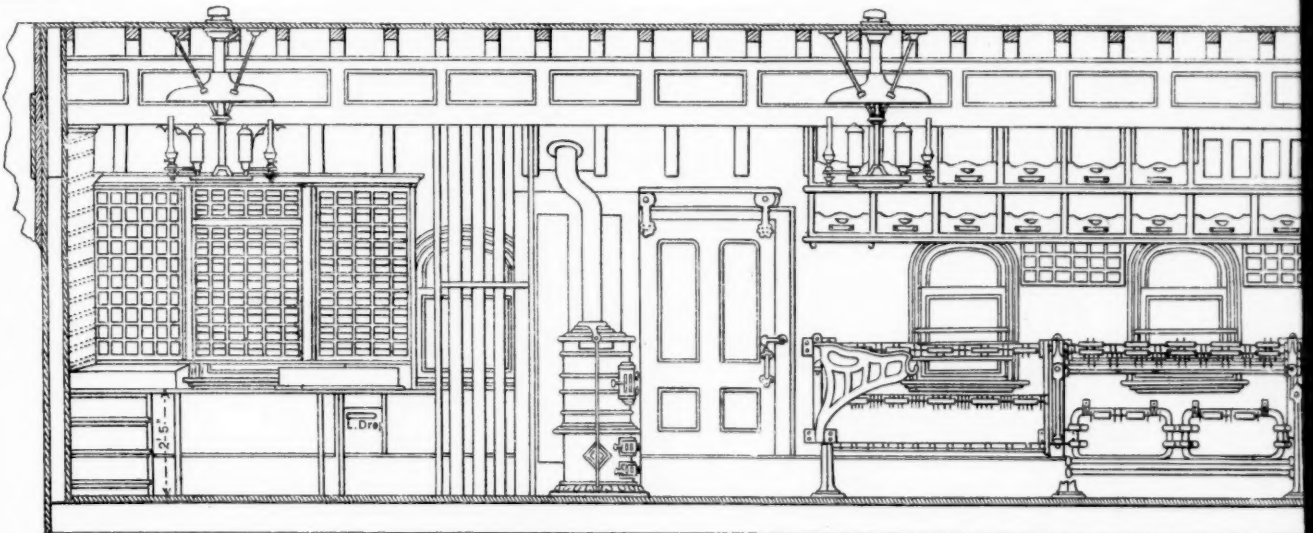
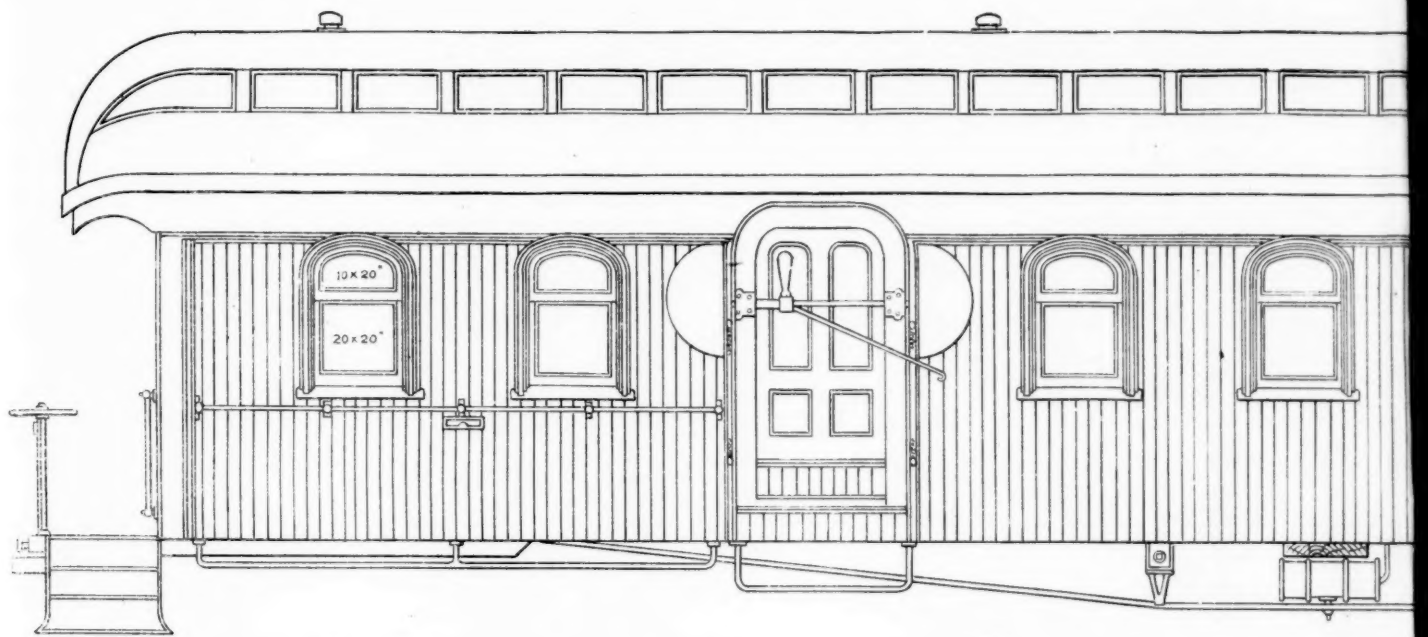
The Trunk Line Through Traffic Movement.

While the east-bound shipments from Chicago in December last were less than in 1884 and every other year but one since 1879, the total eastward shipments from the western termini of the Eastern trunk lines were larger than in any other year except 1881 and 1882, and 22½ per cent. more than in 1884 and 20½ per cent. more than in 1883. This shows that a smaller proportion of the trunk line freight than usual came from Chicago.

Earlier in the year the eastern movement over the trunk lines seems not to have been stimulated by low rates, like the Chicago shipments, for in months when rates were lowest the shipments were not much increased. For instance, the trunk line shipments in December, when rates were maintained on the 25 cent basis, were but 4½ per cent. less than in September, when they were down to 10 and 12 cents, while the Chicago shipments were 20 per cent. less in December; and the difference is also seen in the spring shipments—doubtless due to the fact that a great deal which the railroads at Chicago gain by low rates is simply diverted from vessels which carry to the trunk lines at Buffalo and Erie.

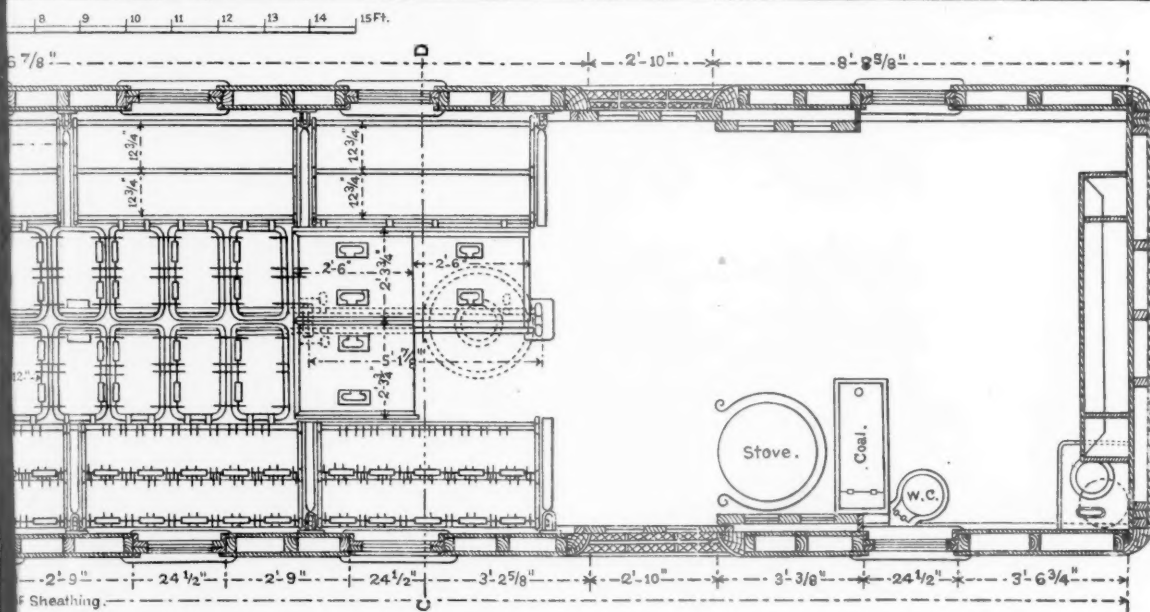
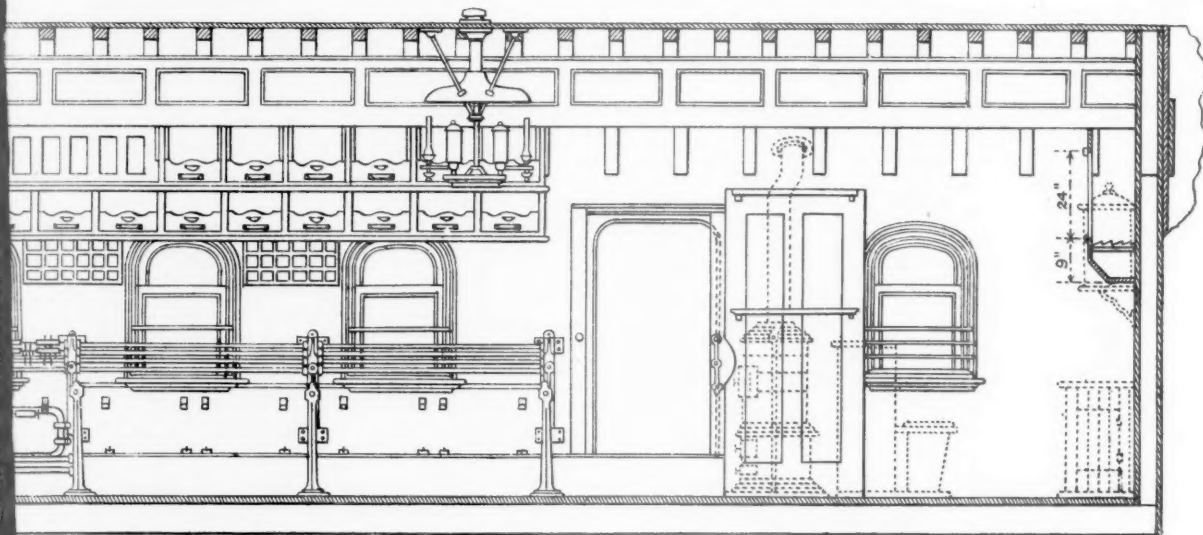
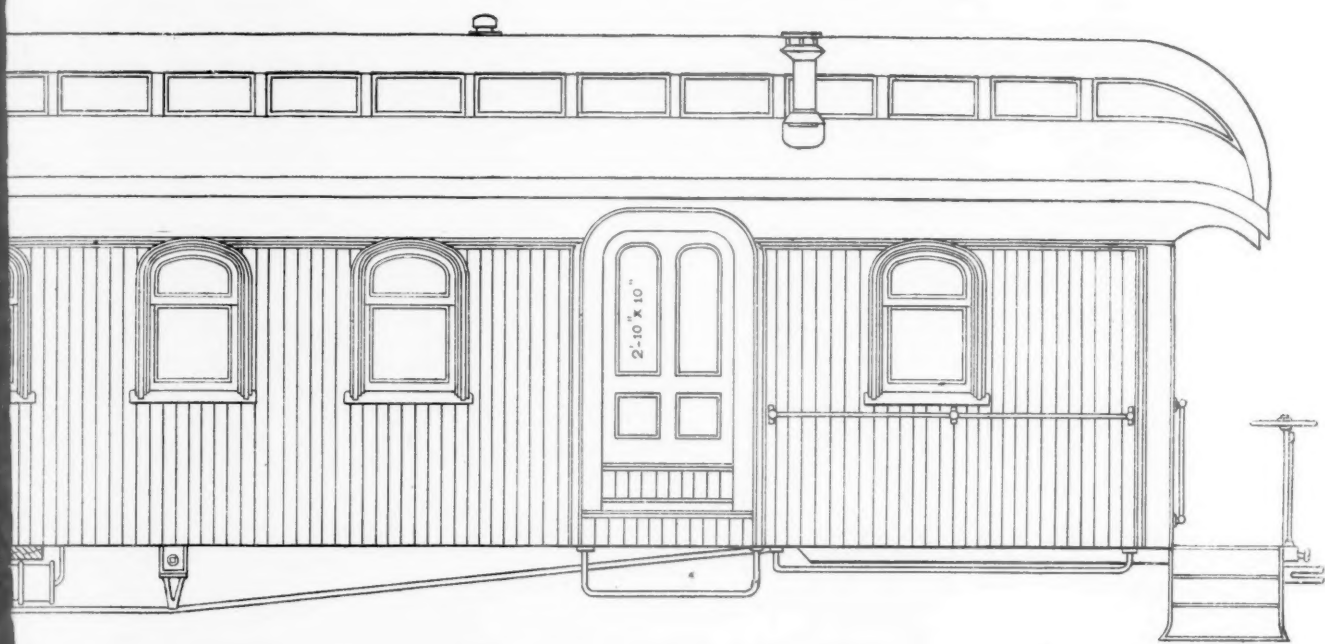
For the whole year the trunk-line tonnage eastward (all going from their western termini, whether to the seaboard or to interior points) has been:

1880.	1882.	1883.	1884.	1885.
10,483,374	9,875,217	10,060,304	8,862,037	9,807,504



THE HARRISON POSTAL

(For description see page



POSTAL CAR.

The increase last year over 1884 is 10½ per cent., but there is a decrease compared with previous years. The shipments by the Lackawanna and the West Shore are not included, however, and these would increase the total considerably in the last two years, and the Lackawanna's somewhat in 1882 also. For the last two years, however, the comparison is accurate as it stands. The new roads carry not nearly as much as the old ones.

This is the largest single traffic movement reported in this country, but it is less significant of the condition of the country, probably, than the west-bound movement, though several times as great; because variations in the quantities of produce marketed and in the proportion of it going by canal have a great effect on the movement eastward. The shipments by rail may be very large when the gross amount realized by the producers is quite small, as was the case last year; and when the producers of the east-bound freight have reduced incomes, they purchase less and so reduce the amount of west-bound freight. This latter fell off materially after 1882, and for six years has been (through from the four seaboard cities):

1880.	1881.	1882.	1883.	1884.	1885.
1,871,770	2,120,205	2,369,896	1,890,259	1,920,845	2,045,625

As this freight includes the larger part of the supplies of certain kinds of goods, especially dry goods, for the whole country, and as the population of the country has increased about 17 per cent. since 1880, there should have been 2,190,000 tons shipped in 1885 to correspond with the movement in 1880. As for nine months of last year the rates were a third less than in 1880, and for four months not half as great, and as a considerable traffic is diverted from the canal and other routes by these rates, it is not probable that the total movement from the seaboard was as large last year as in 1880, and the movement per inhabitant must have been a fifth, or even a fourth, less.

The total shipments in 1885 were 6½ per cent. more than in 1884; but this does not show the improvement that has taken place, because down to September, in spite of the lower rates, the shipments were less than in 1884, and in the last four months of the year they were:

1880.	1881.	1882.	1883.	1884.	1885.
611,380	822,637	706,415	617,921	592,079	721,209

So that in this period, when we may suppose the purchases of the country to be determined largely by the last harvest, the shipments were larger last year than in any other except during the railroad war of 1881, and 22 per cent. more than in 1884, when, however, they were smallest. Doubtless the shipments were increased considerably in September and October last year by the low rates; but examination shows that in the last two months also they were larger than in any other year except 1881, having been in November and December:

1880.	1881.	1882.	1883.	1884.	1885.
277,357	362,243	274,344	256,168	245,920	291,790

The increase over 1884 being 18½ per cent. Thus so far as the east-bound freight movement is concerned, there was a well marked change, beginning after harvest, from a period of great dullness, and though there is nothing in the eastward movement of produce nor in the prices obtained for it, nor in the exports, to which we can attribute the increased purchases of the country, this heavy west-bound movement keeps up.

The east-bound movement, it is true, was considerably (13 per cent.) larger in the last four months of 1885 than in the corresponding period of 1884, but more than three-fourths of the gain for the four months was in September and the first half of October, when it was certainly due mostly to the extremely low rates, and was not an indication of larger total shipments, but chiefly of a diversion of traffic.

The failure of this great trunk line traffic to increase in proportion to population since 1880 is a disappointment, the more so because the movement has been stimulated by a reduction of rates—not simply by railroad wars, but by reductions in the regular rates. Thus the winter rate, when maintained, on east-bound grain has, for two years, been 37½ per cent. less than in 1880, and the summer rate 33½ per cent. less. The reduction in west-bound rates has been something like 18 per cent. on the average. But last year the average rates actually collected were far below these.

So far as the profits of the several roads are concerned, the case is much worse; the reduction in working expenses—legitimate expenses—since 1880 has not been great, so that most of the decrease in rates has come out of net earnings; and the increase in the number of railroads has compelled the division of the smaller profits into a greater number of parts. If this traffic were all the trunk-lines and their connections had to support them, they would be in a sorry case indeed; and so if their other traffic

had fared like this great through traffic. We must not lose sight of the fact, however, that they have had a great increase in local traffic since 1880, there being an immense increase in manufacturing and mining enterprises for two or three years afterwards; and though many of these enterprises have been in a suffering condition for two years past, and there has been little addition to them in that time, doubtless in the aggregate they have afforded a much larger traffic than in 1880, though usually a less profitable traffic. We shall probably have to look to this local traffic, which, when business is prosperous, will be able to pay profitable rates, and to the maintenance of through rates, for the chief part of any increase in profits on the lines between the seaboard and Chicago and St. Louis. There is no indication of a great increase in the amount of through freight, and no one expects ever to be able to get the through rates which were easily maintained in 1880 and part of 1881.

Pennsylvania Railroad Earnings and Expenses.

The December report of this company is the most favorable one made in 1885, the gain in net earnings having been remarkably large. For 12 successive years the gross and net earnings and working expenses of the lines east of Pittsburgh and Erie have been:

Year.	Gross earn.	Expenses.	Net earn.
1879.....	\$2,958,798	\$1,935,601	\$1,023,197
1880.....	3,087,115	1,838,496	1,248,619
1881.....	2,801,171	1,521,555	1,279,616
1882.....	3,082,587	1,710,428	1,372,159
1883.....	2,841,392	1,641,786	1,199,606
1884.....	2,605,297	1,673,363	931,934
1885.....	3,453,924	1,941,870	1,512,054
1886.....	3,547,828	2,451,596	1,096,232
1887.....	3,731,820	2,638,669	1,093,151
1888.....	4,157,938	2,972,329	1,185,609
1889.....	3,840,509	2,857,282	983,227
1890.....	3,789,327	2,673,098	1,096,229
1891.....	4,046,682	2,687,481	1,359,201

Thus the gross earnings last December have been exceeded in that month but once in the history of the road, in 1882; the same may be said of the expenses, while the net earnings were the largest since 1879, and have been exceeded only in 1879 and 1876. Compared with 1884 the increases are:

Amount.	Gross earnings.	Expenses.	Net earnings.
Per cent.....	27.7,355	14,383	262,972
	7.4	0.5	24.0

This is the fourth month of the year that there has been an increase in net earnings. It was \$4,576 in September, \$13,111 in October, \$140,574 in November, and now \$262,972 in December.

The surplus over all liabilities, or the deficiency in meeting them, of the lines west of Pittsburgh and Erie has been in December:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
Surplus.....	Surplus.....	Deficit.....	Deficit.....	Deficit.....	Deficit.....	Surplus.....
\$541,362	\$212,490	\$91,670	\$6,984	\$298,134	\$131,741	\$111,299

Thus these roads had a surplus last December for the first time since 1880, and the gain over last year is \$245,040, which is nearly as much as the gain in net earnings on the eastern system. There has been a profit on this western system in only six months since October, 1883—April, July, September and October, of 1884, and October and December of last year.

Adding the profit or subtracting the loss of this western system from the net earnings of the eastern system we have as the income of both systems:

Year.	1879.....	1880.....	1881.....	1882.....	1883.....	1884.....	1885.....
	\$2,053,416	1,338,742	1,111,581	1,177,928	\$885,093	964,488	1,472,500

Thus, the profits from the two systems were larger last December than in any other, except in 1879, and were \$508,012, or 53 per cent., more than in 1884—a great and sudden gain, in itself more than ½ per cent. on the stock outstanding.

For the year ending with December the mileage, gross earnings, working expenses and net earnings of the lines east of Pittsburgh and Erie have been, for the last 13 years:

Year.	Miles.	Gross earnings.	Expenses.	Net earnings.
1873.....	1,505	\$39,983,139	\$26,733,587	\$13,199,552
1874.....	1,521	37,386,427	23,011,749	14,374,678
1875.....	1,574	34,464,104	21,004,461	13,399,643
1876.....	1,694	36,891,061	22,081,229	14,809,832
1877.....	1,716	31,117,146	19,028,467	12,088,679
1878.....	1,716	31,636,535	18,468,994	13,167,541
1879.....	1,806	34,620,279	20,382,740	14,237,539
1880.....	1,870	41,260,072	24,625,047	16,635,025
1881.....	1,890	44,124,183	26,709,810	17,414,373
1882.....	1,981	49,078,834	30,647,406	18,432,428
1883.....	2,102	51,083,252	31,747,150	19,336,102
1884.....	2,291	48,566,018	30,527,016	18,039,002
1885.....	2,310	45,615,027	29,479,758	16,135,269

Thus, for the year 1885 the gross earnings and the expenses were the smallest since 1881, and the net earnings the smallest since 1879.

The increase in mileage has been quite important—28 per cent. since 1879, and 22½ per cent. since 1881, when the gross earnings were nearly as large as last year, and the net earnings 7½ per cent. larger.

Amount.	Gross earnings.	Expenses.	Net earnings.
Per cent.....	\$2,951,884	\$1,047,251	\$1,904,633
	6.1	3.4	10.6

Compared with 1883, when gross and net earnings and expenses were largest, the decreases have been:

Amount.	Gross earnings.	Expenses.	Net earnings.
Per cent.....	\$5,468,225	\$2,567,392	\$3,200,833
	10.7	7.1	16.5

The surplus or deficit of the system west of Pittsburgh and Erie has been:

Year.	1879.....	1880.....	1881.....	1882.....	1883.....	1884.....	1885.....
	Surplus \$1,623,640	3,072,052	2,648,338	1,894,300	Surplus \$812,669	Deficit 862,852	1,082,024

Thus the deficit was but little greater last year than in 1884, but compared with previous years the loss is from \$1,894,000 to \$4,154,000—a very serious amount indeed.

Adding this surplus to and subtracting the deficit from the net earnings of the eastern system, we have as the income from the two systems:

Year.	1879.....	1880.....	1881.....	1882.....	1883.....	1884.....	1885.....
	\$15,861,179	19,707,077	20,062,711	20,326,728	\$20,148,771	18,473,250	15,053,245

Thus in the year 1885 the profits were smaller than in any other of the seven. The decrease from 1884 is \$3,420,005, which is about 3½ per cent. on the stock outstanding; and compared with 1883 the decrease is \$5,095,526, which is 5½ per cent. on the stock.

The statement for December shows how great a change in the profits of this company a change in circumstances may make.

The Pennsylvania Railroad Company has announced finally the plan which it has had in preparation for some time for a relief or insurance society for its employees, of which a summary is given elsewhere. Under the plan as finally prepared, all employees of the company are to be permitted and requested to contribute an amount based upon their monthly wages and varying from 75 cents to \$3.75 per month. They are to be divided into five classes, the first class consisting of those whose monthly salaries do not exceed \$35; the second, those between \$35 and \$60; the third, those between \$60 and \$80; the fourth, those between \$80 and \$100; and the fifth including all whose monthly salaries exceed \$100. The payment of the monthly contribution will insure a payment, in case of disability from accident or sickness, ranging from 50 cents to \$2.50 per day, this disability payment to continue not longer than one year, in any case, and to be reduced one-half after the first 26 weeks in case of accident. Payment in the event of death from accident will be \$500 for the first class, \$1,000 for the second, \$1,500 for the third, \$2,000 for the fourth and \$2,500 for the fifth class, and one-half of those amounts in case of death from natural causes. The company assumes all expenses of the management of the funds, and guarantees the proper care of all money paid into it, and also all payments which may become due under its regulations. It will also pay into the fund all sums received from fines imposed upon the employees for dereliction in duty.

The general regulations under which the fund will be conducted do not, of course, differ greatly from those which have already been approved by trial in other funds and associations of the same class. They have been carefully prepared, and are evidently intended to meet all contingencies which may arise. While membership in the fund will not be compulsory, but voluntary on the part of the employees, division officers are required to present to the men under their charge the advantages offered, and to persuade them by all proper means to join the membership.

It will be observed that this company's plan differs somewhat from that adopted with so much success by the Baltimore & Ohio, in that the relief fund is a department of the company and under its management, and that the employees are not organized into a separate organization. The officer in charge of the fund will be an officer of the company and appointed by it. He will, however, be assisted by an advisory board in which the company and the employees will have an equal representation.

The charge of the new department is committed to a most competent officer, the first Superintendent of the Relief Fund being Mr. John A. Anderson, who has been for many years Superintendent of the Belvidere Division, and who has given much thought and careful study to the relations of employees to the corporation.

The choice has also been an excellent one from the fact that Mr. Anderson is well known as a friend of the employees, and will undoubtedly command the confidence of all, and especially of that considerable class which is inclined to be somewhat suspicious and fault-finding in the case of any plan proposed by the company.

The Hoar bill, providing for the payment of the indebtedness of the Pacific railroads to the govern-

ment, has been introduced in the Senate again this year, but modified in some particulars.

The bill provides that the "present value" of the debts (which become due in 1897, '96 and '98) Oct. 1 next shall be ascertained on the basis of 3 per cent. interest uncompounded, which will be about 72½ per cent. of the debt at that time, and amount, for all the companies, to about \$112,000,000, as nearly as we can ascertain. This debt is to be paid in 160 equal half-yearly installments, interest at 3 per cent., uncompounded, being added for the average date of payment—that is, for 40 years, which will make the gross sum 120 per cent. greater than the principal, viz., \$246,000,000, and the half-yearly payment \$1,537,500. Now the interest alone on the "present" value of the debt, at 3 per cent., would be \$3,360,000 per year, or \$285,000 more than it is proposed to have the companies pay to retire the principal as well as the interest. The arrangement, therefore, is equivalent to giving the Pacific railroads the principal of what they owe to the government, on condition that they pay interest on it for 80 years at a rate (2½ per cent.) lower than the government even is able to borrow, and at least two-fifths less than the rate which these companies have to pay capitalists for the use of money. It is simply a round-about means of giving these railroads another subsidy exactly like the first one—that is, the use of interest money without interest for a long term of years. For instance, the installment of \$3,975,000 due in 1896, under the Hoar bill, could be provided for by investing \$292,125 in a 3 per cent. sinking fund this year.

When the present value of these debts is ascertained, there is no reason why the companies should not pay interest on it yearly until the principal is paid, just as every other debtor has to do. The original contract with the companies provided that the government should advance the interest and that the companies need not pay it until the principal became due. This contract must be fulfilled; it gave the companies the use of large sums of money without interest for from one to thirty years, and was worth tens of millions to them. This was what their subsidy consisted of chiefly, and nothing is to be said at this day against giving them the advantage of it. But they do get the whole advantage of it by the method of calculating the "present value" of the debts provided by the Hoar bill, and then they are given an entirely new advantage by the postponement of the interest payments for a further and longer period.

It is remarkable that the true effect of the proposed bill seems not to be suspected by the proposers of it even. The reckoning of the interest for the average time of payment helps to conceal it somewhat, but in effect, as we have seen, the bill forgives the whole principal of the debt, and accepts for a limited period 2½ per cent. in lieu of interest and principal. There might be less confusion about it if the fact was realized that the present value of \$1,000 due 80 years hence is about \$95, and that the larger part of the payments required by the bill would be for interest which had remained unpaid and without bearing interest from one to 80 years.

Mr. Charles Paine's resignation of his position as Second Vice-President of the New York, Lake Erie & Western to accept the vice-presidency of the great natural gas company, of Pittsburgh, organized by Mr. George Westinghouse, raises the question why it is that enterprises so much less important than railroads so often are able to take their ablest managing officers from the latter. How they do it we know; they pay higher salaries, or give better opportunities (as in manufacturing enterprises) for making a large income, or a fortune. But it seems absurd to suppose that the services of a man, practically familiar, by a lifetime of service, with all the details of railroad business, should be worth as much to a manufacturing company, earning a few hundred thousand, or even to a gas company, the limit to whose earnings has not yet been discovered, as to a railroad company earning twenty or thirty millions. But it is not always so absurd as it seems. The establishment and organization of a new enterprise, for instance, demands qualities which are of less importance in one already well established. The error of judgment which, in the management of an established business, may result in losing some thousands of dollars of income, in the establishment of a new business may reduce the capitalized valuation by millions. In small enterprises, moreover, the able manager is often tempted by the opportunity of acquiring an interest which, under successful management, will in no very long time grow into a considerable capital; and also by the prospects of greater

permanence and independence than railroad service assures.

There can be no doubt, however, that a great railroad company can afford to pay any salaries necessary to command the highest ability and skill required in its several departments. Whether they are high enough or not depends on their actually attracting this kind of ability. An officer with thousands of men under him, directing the expenditures of tens of millions of dollars, by a slight difference in his efficiency can make a difference in income many times as great as the greatest difference in salaries paid. There have been cases, probably, when companies have paid salaries higher than were necessary to get the best men, as is indicated by the fact that many just as good or better men were secured and kept permanently at lower salaries; but corporations are not likely to err often in that direction unless their stockholders have virtually abdicated, either from hopelessness, or because they are receiving so great returns that they dare not ask for more. They need to keep always in mind, that with officers as with materials, and with officers much more than with materials, and with the chief managing officers most of all, the motto for them is, "Get the best."

There is one feature in this capture of railroad officers by other enterprises which may be welcomed. It tends to make railroad salaries higher. The greater the competition for their services, the better the railroad men will be treated. In many railroad offices a skill in organization and administration are developed which have great value in any enterprise of considerable extent, where the technical railroad knowledge may have almost no value. In this country, however, the growth of railroads has been more rapid than that of almost any other business, and naturally the railroad career has been in the great majority of cases the most promising one to the railroad man.

December Accidents.

Our record of train accidents in December, given on another page, contains notes of 37 collisions, 32 derailment and 5 other accidents; a total of 74 accidents, in which 31 persons were killed and 153 injured.

Eleven collisions, 7 derailments and 1 other accident caused the death of one or more persons each; 10 collisions and 10 derailments resulted in injury to persons, but not death. In all, 19 accidents caused death or fatal injury, while in 20 others there were lesser injuries; a total of 39 accidents, leaving 35, or 47 per cent. of the whole number, in which there was no injury to persons severe enough to be recorded.

The 37 collisions caused 23 deaths and 54 injuries; the 32 derailments killed 7 persons and injured 98, while in the 5 other accidents 1 person was killed and 1 hurt.

Of the persons killed 20, and of those injured 51, were railroad employes, that class of persons thus furnishing 64½ per cent. of the killed, 33½ per cent. of the injured and 38½ per cent. of the whole number of casualties.

As compared with December, 1884, there was a decrease of 31 accidents, but an increase of 7 killed and 44 injured.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:		
Rear	27	
Butting	8	
Crossing	2	
— 37		
DERAILMENTS:		
Broken rail	5	
Broken frog	1	
Broken bridge	1	
Spreading of rails	5	
Broken axle	2	
Broken truck	1	
Accidental obstruction	1	
Land-slide	1	
Snow	1	
Misplaced switch	5	
Unexplained	0	
— 32		
OTHER ACCIDENTS:		
Boiler explosion	1	
Broken parallel-rod	2	
Cars burned while running	1	
Falling rock	1	
— 5		
Total number of accidents	74	

No less than 11 collisions were caused by trains breaking in two. Three resulted from the absence of signals or failure to use them properly; two from mistakes in orders; two from cars blown out of sidings on the main track; one each from a misplaced switch, a runaway train and a conductor's slow watch.

The only broken bridge recorded failed because of the washing out of its abutments by a freshet.

A general classification of these accidents is made as follows:

	Collisions.	Derailments.	Other.	Total.
Defects of road	12	12	1	25
Defects of equipment	12	3	3	18
Negligence in operating	23	5	..	28
Unforeseen obstructions	2	3	2	7
Maliciously caused .....	..	..	..	..
Unexplained .....	..	9	..	9
Total	37	32	5	74

Negligence in operating is thus charged with 38 per cent. of all the accidents, defects of road with 16, and defects of equipment with 24 per cent.

A division by classes of trains and accidents is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains	1	14	2	17
To a pass. and a freight	7	..	..	7
To freight trains	29	18	3	50
Total	37	32	5	74

This shows accidents to a total of 111 trains, of which 25 (22½ per cent.) were passenger trains, and 86 (77½ per cent.) were freight trains.

Of the total number of accidents 42 are recorded as happening in daylight and 32 at night.

The total number of accidents in each quarter of 1885 and 1884, with the number of broken rails, were as follows:

	—1885—			—1884—		
	Total.	Bro. rails.	P. c.	Total.	Bro. rails.	P. c.
First quarter	447	67	15.0	372	38	10.2
Second quarter	218	8	3.6	235	3	1.3
Third quarter	259	8	3.1	278	3	1.1
Fourth quarter	293	19	6.5	306	16	5.2

The month was unusually favorable to railroad work, winter having held off several weeks longer than it generally does, even in the extreme Northwest. Accordingly, we find but one snow accident and comparatively few of the broken rails and other accidents of the classes which generally follow extreme cold weather.

An unusually large proportion of collisions—just one-half the whole number of accidents—are recorded. Nearly one-third of these were the result of trains breaking in two, and this is the most notable feature of the record.

For the year ending with November the record is as follows:

	Accidents.	Killed.	Injured.
January	145	24	182
February	216	44	259
March	86	17	84
April	81	14	75
May	92	6	65
June	75	24	115
July	76	28	75
August	92	37	172
September	91	25	98
October	123	36	134
November	96	19	118
December	74	31	153
Total	1,217	307	1,530
Total, same months, 1884	1,191	389	1,763
" " 1883	1,640	473	1,913
" " 1882	1,364	380	1,588

The monthly average for the year was 101 accidents, 26 killed and 128 hurt. The yearly average for the four years was 1,353 accidents, 387 killed and 1,698 injured.

The averages per day were, for the month, 2.39 accidents, 1.00 killed and 4.94 hurt; for the year, 3.33 accidents, 0.84 killed and 2.19 injured.

The average casualties per accident for the month were 0.419 killed and 2.068 injured; for the year they were 0.252 killed and 1.257 injured.

December makes a good showing as far as the number of accidents is concerned, although the number of killed and injured was above the average.

American Pig Iron Production.

The American Iron and Steel Association has complete reports of the production of pig iron in the United States in 1885, which, as estimated a few weeks ago, was very nearly the same as in 1884, but somewhat less than in any year since 1880, having been, in tons of 2,240 lbs.:

Year.	Tons.	Year.	Tons.
1880	3,535,191	1883	4,595,510
1881	4,144,254	1884	4,097,868
1882	4,653,323	1885	4,044,526

The decrease from 1882, when the production was largest, is 578,797 tons, or 12½ per cent., which is less than might have been expected, considering the falling off in railroad construction and the general dullness in business; but it has been felt the more, because in 1882 preparations had been made for a large increase in production, the natural result of a demand which had increased it steadily and rapidly from 1876 to 1882, and had doubled it since 1878.

The decline since 1882 has not been as great as after 1873, when the production for four years was:

1873.	1874.	1875.	1876.
2,560,962	2,401,292	2,023,733	1,868,961

so that in three years the production fell off 692,001 tons, or 27 per cent., against 578,797 tons, or 12½ per cent., from 1882 to 1885. It will be noted that the production declined for only three years after 1873, and that now, after having declined for three years after 1882, it has, at least for the time, begun to increase.

To complete the record we add the production for the three years after 1876:

1877.	1878.	1879.
2,966,594	2,301,215	2,741,853

Thus after the decline for three years from 1873 to 1876, we had an increase for six years from 1876 to 1882. We are ready for another six years' growth now, but we shall not expect it to be as much as 147 per cent., as from 1876 to 1882. If it is, we shall produce 10,390,000 tons in 1892, which we should hardly be able to dispose of without making large exportations. This suggests that there are many industries in the country which are not likely to have as rapid a development as they have had heretofore. After having obtained our supply of some goods from abroad, time and circumstances make it possible to produce our supply at home, and when this once begins the progress may be very rapid until nearly the whole supply is produced here; but then it is not likely to be much if any faster than the growth in population, unless we can manufacture cheap enough to compete with Europe for the supply of other countries, which has not often been possible heretofore.

If, therefore, there should be another period of great industrial growth in this country, as from 1878 to 1881, we may not be surprised if it is a different set of industries that make the great growth.

That pig-iron production has already begun to increase is

shown by this report, which gives the production in each half of the last two years as follows:

1884.		1885.	
1st half.	2d half.	1st half.	2d half.
2,024,836	2,073,743	1,920,372	2,123,976

By which it appears that the lightest production was in the first half of 1885, when it was 5 per cent. less than in the corresponding half of 1884, while in the last half the production was 2½ per cent. more than in 1884.

Not all districts, however, increased their production in the last half of last year. While the total production was greater by 10½ per cent. in the last half, much the larger part of the gain was in Pennsylvania, New Jersey, New York and Illinois, while Alabama, West Virginia and Wisconsin produced less in the last than in the first half of the year, and Ohio, the state second in production, very little more.

Pennsylvania more than held its own last year, producing 54 per cent. of the total United States production, and Ohio is second with a very wide interval, having 12½ per cent., and Illinois, which imports both the ore and the fuel used in its furnaces, is third with 7½ per cent., and Alabama fourth, with 5 cent. This leaves 21½ per cent. for all the other states together, and three of them, Virginia, Tennessee and New York, with nearly equal amounts, produced more than half of this—about 3½ per cent. each. West Virginia, which 15 years ago began to be held up as a second Pennsylvania, produced but 61,613 tons, or 1½ per cent. of the whole—about one-fifth as much as Illinois. The whole South-east of the Mississippi produced 619,369 tons, or 15.3 per cent. of the whole—about one-fourth more than Ohio. Five Western states, hardly regarded as iron states at all—Michigan, Indiana, Illinois, Wisconsin and Missouri—produced just as much as Ohio—an eighth of the whole.

The whole Northern production, however, is produced chiefly by fuel from Pennsylvania and Ohio, New York and New Jersey in the East smelting with Pennsylvania anthracite, and Illinois, Michigan and Wisconsin in the West with Pittsburgh coke. Aside from charcoal-iron, probably about five-sixths of the pig iron manufactured in the United States was smelted with Pennsylvania and Ohio fuel.

Though the quantity of anthracite coal mined has varied from 23,437,000 to 31,793,000 tons in the last six years, the proportions produced by the different companies have not changed very greatly, the greatest change being the decrease of the Reading from 40.1 per cent. of the whole in 1880 to 36.3 in 1884 and 39.9 in 1885, its loss being offset by gains from other companies, the largest being by the Pennsylvania (from 8 per cent. to 10.7). The production in 1880 and 1885 was:

	1880.	1885.	Increase.	P. c.
Phila. & Reading.....	11,680,780	9,404,665	2,276,715	24.2
Lehigh Valley.....	6,107,445	4,394,532	1,712,913	39.0
D. & L. & W.....	4,987,834	3,550,348	1,437,486	40.5
Del. & Hudson.....	3,301,873	2,674,705	627,168	19.7
Pennsylvania.....	3,393,085	1,864,031	1,529,054	82.1
Penna. Coal.....	1,500,686	1,138,467	362,219	31.8
Erie.....	611,226	411,094	240,132	58.4
Total.....	31,613,529	23,437,242	8,185,287	34.9

These rates of gain continued for another five years would make the total consumption about 43 million tons and give the Reading 14½ million tons, the Lehigh Valley 8½, the Lackawanna 7, the Pennsylvania more than 6, the Delaware & Hudson 4, the Pennsylvania Coal Co. nearly 2 and the Erie 1 million tons, so that the Reading's share would be 33.9, instead of 36.9, and the Pennsylvania's 14½ per cent., instead of 10½.

The increase in production was made all at once, as it were, but previous to 1879 there had been several years of stagnation, from 1873 to 1878, inclusive, averaging 19,670,000 tons, and varying from 21,228,000 (in 1873) to 17,605,000 (in 1878). Since 1878 it has been in thousands of tons:

1873.	1880.	1881.	1882.	1883.	1884.	1885.
26,143	23,437	28,500	29,120	31,793	30,757	31,624

There is no such gain in this latter period as that from 1878 to 1879, which was 8,558,000 tons, or 48 per cent.; but the gain from 1880 to 1881 was 5,063,000 tons, or 21½ per cent. The maximum was reached in 1883, and then the production was but 5,650,000 tons, or 21½ per cent., more than in 1879; for the last three years the production has been almost stationary, as from 1873 to 1878.

Great quantities of coal are carried by the above railroads (especially by the Erie and the Pennsylvania), which is mined on some other road, and, therefore, not included above.

The effect of the Western blockades on the receipts of grain at the Northwestern markets is shown below by the arrivals, in bushels, for the last three weeks reported:

Jan. 2.	Jan. 9.	Jan. 16.
5,031,673	2,802,330	1,863,270

Proportionally, the decrease has been largest at Chicago, but it has been very large everywhere else except Duluth.

There was but little improvement in the Chicago through rail shipments in the week to Jan. 23. For successive years they have been, only flour, grain and provisions being included for the last two years, and freight of all classes previously, in tons:

1880.	1881.	1882.	1883.	1884.	1885.	1886.
35,654	60,317	77,079	53,637	53,327	50,331	25,932

The shipments were thus but about half as great this year as last. To compare with previous years we should probably add 12,000 to 16,000 to the amount reported this year, for the higher class and other unreported freight. Such allowance makes the shipments this year about 10 per cent. more than in 1880, about one-fourth less than in 1883 and 1884, a third less than in 1881 and little more than half as great as in 1882, when rates were about as low as ever were known. Compared with 1881, the gross earnings from the shipments were about as 10 to 21, the railroads then getting \$2 per ton

more than now on shipments to New York; the net earnings were about as 8 to 30.

For six successive weeks the total shipments and the percentage taken by each railroad have been:

Tons:	Week ending.					
	Dec. 19.	Dec. 26.	Jan. 2.	Jan. 9.	Jan. 16.	Jan. 23.
Flour.....	5,139	7,024	4,495	3,206	3,804	4,416
Grain.....	21,369	18,831	19,440	17,056	10,713	12,736
Provisions.....	10,522	11,715	10,278	8,913	8,965	8,800
Total.....	36,930	37,573	34,213	29,175	23,482	25,952
Percent.:						
C. & Grand T.....	9.0	10.6	11.8	7.7	7.2	7.5
Mich. Cen.....	21.0	13.5	11.0	13.4	12.0	12.0
Lake Shore.....	15.1	20.3	14.7	16.5	14.7	16.3
Nickel Plate.....	10.5	10.0	10.4	8.7	6.4	8.3
St. Wayne.....	16.9	16.0	16.4	16.7	23.7	18.1
C., St. L. & P.....	11.5	13.2	13.8	11.8	16.4	12.4
Balt. & Ohio.....	7.0	7.0	8.9	13.5	12.0	14.9
Ch. & Atlantic.....	9.0	9.4	13.0	12.2	7.6	10.5
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

The gain last week over the previous week is 13½ per cent. in flour and 10½ in grain, while there is a small decrease in provisions.

The most notable feature in the percentages is the unusually large share of the Baltimore & Ohio, though the amount carried by it was not at all large. It is made the more noticeable because it was nearly all grain (and nearly all corn). The Baltimore & Ohio carried 23.4 per cent. of the grain and more than any other road, which is very unusual. Next to it in grain shipments is the Chicago & Atlantic, with 20 per cent. of the whole, and this also is unusual. It must be remembered, however, that the quantities are very small, and that one or two large exporters might ship all that was carried by any one road. The Michigan Central carried 17 per cent. of the grain, and the other five roads together less than 40 per cent. of it. On the other hand, the two Pennsylvania roads carried 45½ per cent. of the provisions, the Baltimore & Ohio only 7½ per cent., and the Chicago & Atlantic only two tons out of 8,860.

The shipments last week should not have been greatly affected by snow blockades, the lines east and west being open nearly all the week.

The wheat movement to the seaboard has declined still further, and in the week to Jan. 16 was only 75,075 bushels—the smallest for many years and not a day's consumption. This is hardly a fair way of putting it, however, for the consumption is supplied by flour, and the receipts of that, though smaller than usual, were equivalent to 695,771 bushels. It is quite common for the seaboard wheat receipts to exceed 2,000,000 bushels, though not at this season. There were two weeks in the summer of 1884 when they exceeded 3,000,000 bushels, and in one they were more than 4,000,000, and from the middle of July to the middle of November there were but two weeks when they did not exceed 2,000,000. Last year they ranged from 362,000 to 735,000 bushels per week in January and February, from which one may judge how small they are now, when they have fallen to 75,075.

How the foreign market for our wheat has fallen off may be seen by the exports to Europe from Atlantic ports for the eight weeks ending Jan. 16, which were:

	1883-86.	1884-85.	Decrease.	P. c.
Bushels.....	1,775,885	8,810,593	7,034,708	80.0

A decrease of four-fifths is something noticeable. Meanwhile the flour exports fell off more than 40 per cent., making the decrease of wheat and flour equivalent to 8,964,000 bushels.

Against this there was an increase of 2,063,279 bushels, or 27 per cent., in the corn exports, making them really very large for the season, for they were large last year. This does not nearly make up for the decrease in wheat exports, however.

The Massachusetts Railroad Commission is reluctant to add to the number of car couplers, the use of which it has authorized, and has refused an application of the Boston & Lowell for permission to use the Boston automatic coupler on this ground chiefly, and not because of any specific objection to the coupler in question. The Commission has, however, added the Hien coupler to its list, the application in this case being made by the New Haven & Northampton Company, and granted because that company has already a large number of those couplers in use, and because it is approved by the Railroad Commission of Connecticut, in which state a large part of the company's road is situated.

A correspondent who calls himself a retired railroad man, interested in the discussion of steel-tired and cast-iron wheels, urges that sufficient attention is not paid to the equal distribution of metal in the "built up" wheels, like the Allen, Paige and Dickson wheels, which he claims secure a "running balance" and freedom from jar and roar, not possible with cast-iron wheels, whose inequalities he credits with constant quiver of everything movable in passenger cars carried on them.

The efforts which American railroads make to prevent the destruction of the profits on their business by unrestricted competition are attracting much attention abroad. The new contract of the trunk lines has been described in a French journal, and now the *Journal* of the German Railroad Union publishes a translation of it in full, and also the official Austrian railroad journal.

The following note, which appears in *Engineering*, illustrates the enormous difference between this country and England as respects the extent to which interlocking apparatus is used in each. The statement opens with a table showing

ing that there are 18 different sizes of standard signal cabins on the London & Northwestern Railway, which are:

A. 5 levers, 6×6 ft.	D. 20 levers, 16 ft. 2½ in.×12 ft.
B. 10 " 9×9 ft.	E. 20 levers, 16 ft. 2½ in.×12 ft.
C. 15 " 13½×12 ft.	F. 20 levers, 16 ft. 2½ in.×12 ft.
	G. 20 levers, 16 ft. 2½ in.×12 ft.
	H. 20 levers, 16 ft. 2½ in.×12 ft.
	I. 20 levers, 16 ft. 2½ in.×12 ft.
	J. 20 levers, 16 ft. 2½ in.×12 ft.
	K. 20 levers, 16 ft. 2½ in.×12 ft.
	L. 20 levers, 16 ft. 2½ in.×12 ft.
	M. 20 levers, 16 ft. 2½ in.×12 ft.
	N. 20 levers, 16 ft. 2½ in.×12 ft.
	O. 20 levers, 16 ft. 2½ in.×12 ft.
	P. 20 levers, 16 ft. 2½ in.×12 ft.
	Q. 20 levers, 16 ft. 2½ in.×12 ft.
	R. 20 levers, 16 ft. 2½ in.×12 ft.
	S. 20 levers, 16 ft. 2½ in.×12 ft.
	T. 20 levers, 16 ft. 2½ in.×12 ft.

the usual rule being that the cabins are all 12 ft. wide and are 6 in. long per lever, plus about 6½ ft. The statement then continues:

"There are 26,500 levers on the railway and 1,344 cabins. The annual average cost for maintenance is \$187,000, which divided by the number of levers in use on the line, comes to \$7.07 per lever. This amount includes not only the renewal and repairs of the locking apparatus, but that of the signal cabins, signals, and all subsidiary apparatus, and also the cost of providing any new and additional apparatus, when under \$50. The amount of work to be maintained has increased 80 per cent. since the year 1874, while the cost of maintenance has only increased 5½ per cent."

In the whole United States there are, of all systems, somewhat less than 250 cabins and 3,000 levers, as will appear from the statistics in our issue of Nov. 20, or but about one-fifth as many cabins and about one-ninth as many levers as are in use on the London & Northwestern alone, which operates only some 1,753 miles of road.

The hasty deduction which might be drawn from these figures, that either our traffic is immensely less dense than in England, or the management is immensely more reckless, would not be justified for several reasons, arising from the differences in the nature of the traffic; but the figures do indicate very strongly that there is less use of interlocking apparatus in this country than due economy and prudence would require; and when we consider the enormously greater proportion of grade crossings in this country, the inference is strengthened. The costly and clumsy precaution of a full stop at such crossings without other safeguard is a relic of barbarism which we may be tolerably certain will not continue much longer without being looked on as a reproach to the management.

It appears from comparisons of the payments on English roads for personal injuries and loss and damage in 1874 and 1884 that they were, in cents per train mile:

	Personal injury.	Loss and damage.	Total.
1874.....	0.86	0.60	1.46
1884.....	0.32	0.36	0.68
Decrease in 10 years.....	0.54	0.24	0.78

This saving is ascribed by *The Engineer*, whether rightly or not, to the introduction of interlocking signals and other safety appliances; an assumption which is so far justified that in 1874 these appliances were but little used, whereas in 1884 they are all but universal, while no other marked change has taken place in operating conditions.

At this rate, estimating the total train mileage of the United States at 550,000,000 per year, there would be a saving of some \$4,300,000 per annum by equally efficient precautions here, and the Pennsylvania Railroad, which ran 32,618,000 miles east of Pittsburgh and Erie in 1884, would save some \$254,000. As the latter road only paid out under this head in 1884 \$198,114 in all, and as the probable payments in the whole United States (in the same ratio as in the census of 1880), are only some \$4,880,000, this would be doing pretty well. The ratio of decrease is of course the fairer basis, and this has been in England 53½ per cent.

By the last (1884) reports, 95 per cent. of the mileage of England and Scotland and 24 per cent. of that of Ireland is worked by the absolute block system, and practically all the remainder by the "train-staff" system, or some other than our telegraphic train-order system.

In Great Britain the "distance worked by telegraph, but not by the absolute or permissive block," is only some 400 miles in 17,933, or 2¼ per cent. Yet a large proportion of this mileage has less traffic than thousands of miles in this country, which have neither a block system nor any substitute thereof.

The average expense per ton per mile of carrying freight on leading Indian railroads is reported to have been as follows in the last half of 1884, per ton (of 2,000 lbs.) one mile:

East Indian.....	0.447 cents.
Bombay, Baroda & Central India.....	0.875 "
Great Indian Peninsula.....	0.802 "
Rajpootana.....	0.964 "

A few years ago the expense on the East Indian Railway was less than on any other in the world except the Philadelphia & Erie. Its cost of 0.447 cent per ton per mile in the last half of 1884 was greater, however, than has been reported by several of our railroads recently, as 0.365 cent in 1884 by the Philadelphia & Erie, 0.441 by the Pennsylvania Railroad Division of the Pennsylvania, 0.426 by the Lake Shore & Michigan Southern, and in 1884-85 0.409 cent by the New York, Pennsylvania & Ohio. The East Indian, however, reports a much lower cost per passenger than any American railroad, the service rendered being very different, by far the larger part of its passengers being fourth-class and its average train-load several times as great as that of our roads.

An article by Emil Jung in a recent number of the *Zeitung des Vereins Deutscher Eisenbahn-Verwaltungen* gives some interesting facts with regard to railroads in the Argentine Republic. In July, 1884, there were 2,290 miles of line, which had cost, in all, some \$76,000,000, or about \$33,000 per mile. The gross earnings average a trifle over \$4,000 per mile; the net about \$2,000. The net earnings are 51 per cent. of the gross earnings, and about 6 per cent. of the capital invested. The passenger traffic is relatively very important; the freight traffic, as yet, quite small.

The first railroad was opened in 1857. Since that time railroad building has gone on quite constantly. Down to about 1874 all the railroads were constructed with the Spanish gauge of 5½ ft. Since that time gauges of 4 ft. 8½ in. and 3 ft. 3½ in. (1 metre) have also been in use. The last named

gauge is that of the Great Northern, a line about 340 miles long built at a cost of not quite \$25,000 per mile. Although it now pays 6½ per cent. on the investment, it is expected that a change will soon be made to standard gauge.

Most of the companies have received assistance from the government; usually in the form of guarantees of interest, though direct money subsidies and grants of land have also been bestowed.

An account of the staff of the Chicago, Milwaukee & St. Paul Railway, published in *Yenowine's News* (Milwaukee) Dec. 27, gives the birthplace of twenty of the officers of the company. It is due to the youth of the West, doubtless, that only two of these were from west of Ohio—General Freight Agent Bird (in Illinois) and Assistant General Freight Agent Goll (in St. Louis). It is also notable that most of the officers are natives of New York and New England, though this can be said of a great many other railroads and probably of most western railroads—until recently most of the people of the West having been natives of those districts. The little agricultural state of Vermont supplied no less than four of these men; the small manufacturing state Connecticut, three; the great state of New York, four; Maine and Massachusetts, one each; Virginia, Ohio, Scotland, Wales and Canada have each supplied one.

It is not so strange that such an overwhelming proportion should be Eastern men when we remember that a railroad is necessary to make a railroad man; that only the leading officers are given in this list, and that men do not usually reach these positions until after the age of 40. Twenty-five years ago, when most of these St. Paul officers were learning their business, there were only 11,000 miles of railroad west of Pennsylvania. Only one of the officers named is less than 40, three more less than 45, two more less than 50, and twelve are 50 or more, of whom five are 60 or more. Doubtless a list of the lower officers would show more young men and more Western men. It is remarkable that not one on the list is a native of Wisconsin.

The final issue of the "debenture stock" of the Buenos Ayres & Pacific Railway, bearing 7 per cent. interest guaranteed for 20 years by the government of the Argentine Republic, was placed in London in January of this year at 115.

The *American Engineer* gives in its issue of Dec. 17 a comparative record of two different trips of the same engine, weighing 40½ tons, or with loaded tender some 65 tons, over the same track and with the same crew, direction, stops, weather and all other conditions, so far as might be, except that in the one case the train consisted of 30 loaded cars, and in the other of only 23. The length of run, details of engine and grades and location of test are not given, but it is stated to be the actual result of an accurate test, the whole train having been weighed before starting. Considering that the record is given as an example of "Analysis in Railway Practice," the omission of these important details, by the aid of which alone the reasonableness of the performance and reported results can be accurately gauged, is surprising, but even without these data the results have a certain interest. According to the record, the cutting down of the train from 30 to 23 cars had the following effect:

	With 30 cars.	With 23 cars.
Lbs. water evaporated per lb. coal increased from.....	4.56 to 5.97, or	31 per cent.
Lbs. coal burned per ton of total train decreased from.....	14.0 to 11.74, or 16.2	"
And by comparison of the two:		
Lbs. water evaporated per ton of total weight increased from.....	63.8 to 70.2, or 10.0	"

Here we see that the consumption of steam was, as might be expected, slightly more with the light train than with the heavy one per ton, since the average resistance per ton will be slightly larger, but the evaporative efficiency of the boiler was decreased about one-fourth by increasing the coal burned per hour from about 67 lbs. to about 100 lbs. per square foot of grate.

Few records of this kind show so extreme a difference and many show very little difference, so that the result cannot be considered an entirely fair one. The difference, when it exists, can only arise (1) from imperfect combustion; (2) from the escape of more heat with the gases of combustion; and (3) by the blowing of unconsumed coal out of the smoke-stack. Both these two latter causes were no doubt acting, but the last one must have been the chief factor in so extreme a result, and in it doubtless lies the chief moral of the test. Even in this case, moreover, when the train wages are taken into account, an economy of 16 per cent. per ton-mile appears, without considering the saving in maintenance of way and rolling stock from running fewer trains.

The December earnings of 11 railroads are reported for this week, but nearly one-half of their aggregate earnings were by one of them, the Pennsylvania, and one-third by another, the Reading. Seven of the 11 roads report an increase in earnings which is large in some cases, as 45 per cent. by the Gulf, Colorado & Santa Fe, 19 by the Des Moines & Fort Dodge, 14½ by the Northern Central and 12 by the Reading. The Pennsylvania's increase at the moderate rate of 7½ per cent. is more important, however. On the other hand, a decrease of 11 per cent. is reported by the Chesapeake & Ohio, and of 17½ by the Kentucky Central.

The aggregate earnings in December of the railroads that have reported them so far have been:

	1885.	1884.	Increase.	P. c.
Earnings.....	\$28,524,746	\$26,991,510	\$1,533,227	5.7

This is a very satisfactory result, and it has been made more so by the reports that have come in during the past week, five of which are by Eastern roads. Two-fifths of the entire increase of \$1,533,000 is by these Eastern roads,

which in December first got the full benefit of the restored through rates, and also probably felt then more than before the greater activity in manufacturing industries.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1886 is given in the current number of the *Railroad Gazette* as follows:

Ohio Valley.—Track laid from Henderson, Ky., southwest 3 miles.

Saratoga & Almaden.—Extended eastward to Saratoga, Cal., 5 miles.

This is a total of 8 miles on 2 lines, making in all 23 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

Miles.	Miles.	Miles.
1886.....23	1881.....71	1876.....44
1885.....20	1880.....98	1875.....32
1884.....41	1879.....52	1874.....32
1883.....61	1878.....72	1873.....70
1882.....138	1877.....22	1872.....43

These figures include main track only, second tracks and sidings not being counted.

NEW PUBLICATIONS.

Text Book of the Materials of Construction for use in Technical and Engineering Schools, by R. H. Thurston, Professor of Mechanical Engineering Cornell University, etc., etc. Published by John Wiley & Sons, New York.

This is an abridgement in one volume of the author's larger work in three volumes, *Materials of Engineering*. The preface states that this volume "contains all the parts of the larger work which are essential for those studying engineering, and gives an account of the origin, nature, method of preparation, and the useful properties of all the common and so-called useful metals, with particulars of their strength, elasticity and other qualities essential to their introduction into the various constructions which the engineer is called upon to build or to inspect."

While the book cannot fail to be useful to students, it contains many specimens of crude information which may possibly mislead the unwary. The following paragraph may be taken as an example:

"The mean duration of rails of Bessemer steel is, according to experiments in Germany, about 16 years. Ten years of trial at Oberhausen, on an experimental section of the line between Cologne and Minden, has shown that the renewals during the period of trial were 76.7 per cent. of the iron of fine grain, 68.3 of those of cementation steel, 33.3 per cent. of those of puddled steel, and 3.4 per cent. Bessemer steel."

Not a hint is here given as to the principal causes which determine the wear of rails. The student is not told that the amount of wear depends not only on the quality of the steel, but on the weight of the rail and the nature of the ballast and many other modifying conditions. He is left to infer that "cementation steel" has been commonly used for rails, though he would rightly conclude from the figures given that there is very little of it left. The fact that steel rails wear better than iron rails is barely stated, but would it not be well that the student should be told the simple reason? Steel is a homogeneous mass bound firmly together, each atom supporting its neighbor, while the iron rails usually sold were bundles of fagots tied loosely together, and consequently burst asunder and failed in detail under a load. It is well known that well piled iron rails, in which all the fibres are soundly welded together, wore very nearly as well as steel rails; but it was easy to get good steel rails and almost impossible to get good iron rails, and therefore the latter were superseded by the more trustworthy material. The wear and durability of steel rails is a very important question. A greater weight of steel is in use in the form of rails than in all other forms put together, and as the data on the subject are tolerably complete and easily procured and collated, it is a pity that the author has not made some effort to summarize the conclusions arrived at by competent authorities.

Nevertheless, from the very fact that rail manufacture and life is so immense an interest, it is to some extent excusable that a general treatise on engineering materials should not enter exhaustively into what is almost a fit subject for a treatise in itself, and which in a sense at least may be claimed to be as far apart from the proper scope of the book as would be a discussion of the life of iron bridges or buildings; but if the subject was to be touched upon at all it should not be dealt with in so sketchy and inadequate a manner.

The crying fault, in fact, of this as of other of Prof. Thurston's publications is that, while the result of no common amount of study and original investigation, making them in some respect of great and even unique value, the material is merely thrown together rather than digested and collated. A text-book for the use of students should be compact and portable in form and concise in language. Both the author and the publisher appear to have too much ignored these requirements. The book is unnecessarily heavy and bulky, notwithstanding many important omissions. Nothing for instance appears to be said as to the strength of Whitworth compressed steel, about the strongest known material available commercially. Many of the tables and formula might have been expressed in considerably less space, without omitting anything of importance. The wide margins swell the size of the volume considerably, while its great weight will render it a formidable missile in the hands of athletic students giving to hazing. A better way to have reduced the size of the original three volumes would have been to abbreviate this unnecessary bulk of paper more and the text less, and in so far as the text was abbreviated, to have abbreviated it more with the pen and less with the scissors.

There is so much that is good and commendable in the volume, that one regrets not to be able to approve it more heartily, but in these days of many books it may be justly

demanding of any author that he shall not simply throw together material, however valuable that material may be.

TECHNICAL.

Locomotive Building.

The Cooke Locomotive Works in Paterson, N. J., have taken a contract to build 6 passenger and 2 freight locomotives for the New York, Ontario & Western road.

The Baldwin Locomotive Works in Philadelphia last week delivered a consolidation freight engine to the Pratt Coal & Iron Co., of Birmingham, Ala., for use on its branch road.

The Car Shops.

The United States Rolling Stock Co. has taken a contract to build 1,000 box cars for the Chicago & Northwestern Railroad at its shops at Hegewisch, near Chicago.

The Fort Worth & Denver car shops in Fort Worth, Tex., are building 125 stock cars for the road.

The Peninsular Car Works in Detroit have recently taken contracts for 525 box cars for the Union Pacific and 200 flat cars for the Union Iron & Steel Co., of Chicago.

The St. Charles Car Co. in St. Charles, Mo., is building some box cars for the St. Louis, Alton & Terre Haute, and has several other small orders.

The Missouri Car & Foundry Co. in St. Louis is building 400 box cars for the Chicago & Alton road. The shops are now full of work.

Bridge Notes.

The partnership heretofore existing between Moritz Lassig, of Chicago, and John F. Alden, of Rochester, N. Y., under the firm names of Lassig & Alden, Chicago, and Alden & Lassig, Rochester, was dissolved Jan. 1. Mr. Lassig retains the business in Chicago, assuming all credits and liabilities of the firm there. Mr. Alden retains the business in Rochester, assuming all credits and liabilities of the firm there, and continuing the business under the name of the Rochester Bridge & Iron Works.

The Keystone Bridge Co. in Pittsburgh has recently taken several small contracts for bridges and has its works well employed.

Iron and Steel.

The Pennsylvania Steel Co. at Steelton, Pa., has blown out its No. 3 furnace for repairs, but the furnace will be started up again as soon as possible.

Preparations are being made to start up the large blast furnace at Riddleburg, Pa., formerly owned by the Kemble Coal & Iron Co., but now the property of Nimick & Co., of Pittsburgh.

The Western Steel Co. in St. Louis is making extensive preparations and improvements in its steel rail mill, and will start the mill up in a few weeks.

Midland Furnace in Crawford County, Mo., made 18,682 tons of pig-iron last year.

Manufacturing and Business.

The Dean Brothers' Steam Pump Works in Indianapolis have been enlarged by the addition of a new brass foundry. These works have recently taken the contract for a large pumping engine for the water works at Charleston, Ill., besides other smaller orders.

The railroad supply business heretofore carried on in Troy, N. Y., by Mr. F. W. Richardson, whose much-regretted death is noticed in another column, will be continued at the same place and under the general supervision of his father, Mr. George W. Richardson.

The Rail Market.

Steel Rails.—Quotations continue at \$34@35 per ton at mill in Pittsburgh, the inside figure for large and desirable contracts. The sales so far reported for 1886 delivery are somewhat over 725,000 tons, or fully one-half the capacity of the mills.

Rail Fastenings.—Prices continue firm, with increasing demand, and quotations are steady at 2.25 cents per lb. in Pittsburgh for spikes; 2.70@3.00 for track bolts, and 1.70@1.75 for splice-bars.

Old Rail.—The market for old iron rails is active, with quotations from \$22@23 per ton at tidewater, with several sales reported at \$22. Old steel rails are scarce, and are quoted at \$22@23 per ton in Pittsburgh.

Safety-Valve Patents.

The Boston *Record* of Jan. 20 says: "The suit brought by the Consolidated Safety Valve Co. against the Ashton Valve Co., in the United States Circuit Court for the district of Massachusetts, were decided this morning by Circuit Judge Colt in favor of the Ashton Valve Co."

"These suits were based on the Richardson patents No. 58,294 and No. 85,963, which were held valid by the United States Supreme Court last spring. In the first suit the bill is dismissed, and in the second suit the injunction is refused."

Massachusetts Commission Decisions on Car Couplers.

In the matter of two applications from railroad companies for leave to use other couplers than those heretofore approved by the Board, the Massachusetts Railroad Commissioners have given decisions as follows:

THE BOSTON AUTOMATIC COUPLER.

"The Boston & Lowell Railroad Co. asks the Board to approve the Boston automatic freight car coupler for use in the state under the provisions of chapter 222 of 1884.

"The Board has often expressed its reluctance to enlarge the number of freight couplers prescribed for use by the railroads of this state, desiring rather to increase the safety of brakemen by diminishing the number of devices to be used in coupling cars. If it were proved that a new coupler is just as good as any of the five already prescribed, it would not follow as a matter of course that it should be approved. For variety of devices is itself a source of danger, and perfection in this matter will be gained only with entire uniformity. No testimony was given at this hearing, except that the railroad company had equipped two cars, and had tested the device by use on extended trips, where it had worked well. This does not call for action, and the request is not allowed."

THE HIEN COUPLER.

"The New Haven & Northampton Co. applies for an approval of Hien's safety freight coupler, under the provisions of chapter 222 of the acts of 1884. The company, which owns and operates a railroad in Connecticut and Massachusetts, has for a long time used many of these couplers with the approval of the Connecticut Commissioners, and has found them satisfactory in every way. Its skilled officers prefer them to any coupler in existence without regarding the cost.

"The Board are reluctant to increase the number of freight couplers, because safety is to be found not only by selecting good devices, but by reducing the number. But this application rests on peculiar grounds. The Hien coupler is used by this company under the law of Connecticut and under the approval of its Commissioners, and it is believed by the managers to be the best device of its kind. We know it to be a good one.

"When a freight train enters Massachusetts we cannot say

that the company shall be proceeded against. We never have called upon the Supreme Court to enforce the law against the company conducting interstate commerce under such circumstances; nor should we expect the court to intervene if such an application were made. But in case of accident, the company might possibly be held liable for a violation of the state law, and it is for protection against this contingency that this application is made. The Board feel bound to grant it; and cannot do so without giving leave to all railroad companies in the state to use the coupler, which we now affirm."

A Double-truck Locomotive.

A single-ended double-truck engine, the "Pokanoket," has just been built by the Mason Machine Works, Taunton, for the Providence, Warren & Bristol Railroad. The engine is especially built to work over a curve of 211 ft. radius (27.33°) on a change of alignment which has been recently made in East Providence, near the eastern end of the bridge over the Blackstone. It has a wagon-top boiler, an extension front, and straight stack. The boiler is of 48 in. diameter, with 165 tubes, 11 ft. 10 in. long and 2 in. in diameter. The furnace is 72 by 38, and the cylinders 16 by 24 in.

The four drivers are 56 in. in diameter, with 3-in. Krupp tires with a 7-ft. wheel base. The leading pony truck wheels (Brunswick pattern) are 28 in. diameter, and are placed 7 ft. forward of the front drivers. The total wheel base is 35 ft. The tank holds 2,000 gallons, and this end of the engine is carried on a six-wheel truck, with 30-in. Brunswick wheels. The weight of the engine in working order is as follows:

Front truck.....	10,500 lbs.
Drivers.....	57,000 lbs.
Hind truck.....	50,000 lbs.

117,500 lbs.

The cab is wholly inclosed, with windows front, back and sides. The engine is designed to run in either direction, and in running backward the end of the Fairlie truck can be locked to the main frames. Two Sellers injectors, both on the engineer's side, take their supply from cast-iron wells beneath the tank in order to insure a steady supply while switching or when the brake is suddenly applied.

A Railroad in Central Africa.

Science for Jan. 22 says: "In the number of Science for last week we noticed the railroad running across the deserts of Asia towards Merv and Bokhara. This week we wish to call attention to the first well-developed plan for the construction of a railway connecting the interior of Africa with the Atlantic Ocean. On Dec. 23, 1885, an agreement was made at Brussels, between the independent state of Kongo, and delegates from the Kongo Railway Co. of Manchester, England, granting to this company the right to construct a railway to connect the upper and lower Kongo. The delegates of the English company were Messrs. Hutton, M.P., President of Manchester Chamber of Commerce; Mackinnon, director of the British-Indian Steam Navigation Co.; and Stanley. The directors of the railroad company are the three delegates before mentioned; and Messrs. Adamson, President of the ship-canal to connect Manchester with Liverpool; Jacob Bright; Lord Egerton; Sir James Ferguson, M.P., and former Governor of Bombay; W. H. Houldsworth, M.P.; and H. M. Steinthal of Manchester. The capital will be \$5,000,000, and subscriptions will be immediately opened in the capitals of the four states which signed the general act of the Kongo conference at Berlin. The railroad will be constructed within the territory of the state of Kongo, either on the south side of the river, between the frontier and Leopoldville, or in two sections—one on the right bank of the river, and the other on the left."

Rolling Circular Weldless Boiler Plates.

An entirely new type of rolling-mill, which has been especially constructed from the designs of Mr. John Windle, of Manchester, England, for rolling vertical circular weldless boiler-plates, 4 ft. wide up to 16 ft. internal diameter, is about completed by Messrs. Daniel Anderson & Co., of Hyde Junction, for the Victoria Steel & Forge Co., Barrow. The mill, with the engines, is throughout of massive construction, and the total weight of the plant complete, when fixed in position, will be nearly 300 tons.

The mill is carried upon a foundation base plate 35 ft. in length by 17 ft. in width, which weighs about 90 tons. The main driving-roll is 22 in. diameter, 4 ft. wide between the flanges, and the bearings are 12 in. diameter in the necks. The set-up roll, which acts in the same way as the roll in an ordinary horizontal mill, is 18 in. diameter, and is actuated by hydraulic power, having a total range of 16 in. The mill itself is driven directly by means of a vertical spindle, and the engines to which this spindle is geared, by means of a pair of steel bevel wheels weighing 12 tons, are placed directly underneath.

The bottom of the vertical shaft is carried upon a massive foundation base-plate and foot-step weighing 30 tons. The engines are a pair of the horizontal type, with 40-in. cylinders, and 4-ft. stroke, the crank-shaft being 27 ft. long and 16 in. diameter in the necks. The engine-bed is of the trunk girder type, cored out for the reception of the slides, and the cylinders are fitted with the patent Wheelock automatic expansion gear. The engines complete will weigh about 140 tons, and at 100 revolutions will work up to 3,000 indicated horse-power.

A New Ferry Steamer.

The New England Shipbuilding Co. of Bath, Me., has commenced work upon the new steamer for the Maine Central Railroad Co. to be used upon its Bar Harbor ferry route. The vessel will be 156 ft. long, 38 ft. wide and 10 ft. deep, and will be built with special reference to speed and the peculiar necessities of its route from the railroad terminus at Sullivan to Bar Harbor. In several respects the steamer will be a novelty. Its hull will have no guards, but very flaring sides, and below the water line will be nearly circular in form. This shape will give the same amount of deck room and also the same breadth of hull at the load line, and will present a much easier shaped side to the action of the waves in rough weather than a boat with guards. It will also be lighter in weight for the same strength of structure, and with a long boiler of small diameter placed low down in the hull the boat's stability will be very great.—*Boston Traveller*.

THE SCRAP HEAP.

An Old Locomotive.

There is an old engine, numbered 14, now doing duty on the Alleghany Iron Mountain Railroad, whose voice used long ago to waken the shrill echoes in the valleys and mountains of Central Virginia. Way back in 1855 this old engine was the pride of the then Virginia Central Railroad, running from Richmond to Louisa, and latter to Gordonsville. Even after the new order of things since the war No. 14 held a proud position among the fast passenger engines on the Chesapeake & Ohio Railway, but for years the once monarch of the road has been relegated to the obscure position of yard engine, until procured by the Alleghany Co., and, burnished up by one of its old masters, Mr. James Felter, its sphere of usefulness is enlarged. If engines could only talk, what a

volume of important events would this old fellow narrate. What precious freight has been committed to its care. How many old Virginians have waited on narrow platforms for the "keers." What mighty state secrets have been discussed behind its steaming smokestack. Covering a period of the most intense interest in the history of Virginia, the old engine still survives, while many, aye, perhaps all the human actors in those scenes have boarded the long train, by which no return tickets are sold. Engineer Ally, a veteran on the road, well known to Chesapeake & Ohio men, was for many years the man who pulled the throttle of No. 14 on the Virginia Central road. The son of this old engineer runs an engine on the road now. The old man is side-tracked by the Dispatcher of the Universe. Mr. Felter, the present engineer, used to stand in the cab, and, with the fidelity of a hero, still stands by his old friend. The old engine does effective work in its present position, and, under the careful management of Mr. Felter, years of service may yet be left the hero of other days.—*Alleghany Sentinel*.

A Long Walk.

Henry Skehan has been an employe of the Erie road for many years, and was one of the bands who laid track between Attica and Portage during the months of March, April, May and June, 1852. When the track was laid he went to work on the Linden section under its first foreman, Charles L. Beman, of Attica, Oct. 1 of the same year. Since then he has been track-walker on the Linden section, and up to Oct. 1 had covered 189,924 miles. This beats the record of Wm. Colary, of Hinsdale, N. Y., recently published, by 61,444 miles.—*Western New Yorker*.

A Brave Conductor.

Conductor John A. Brown, of the Missouri Pacific train which was snowbound near Council Grove, did a most heroic act in carrying John Tallman to Council Grove, a distance of a mile and a half, on last Thursday night, with the thermometer at 22° below zero. Tallman had fallen and broken his leg. To leave him there meant certain death to the poor fellow, while to carry him might mean death to both. What acute suffering was undergone by the brave man, staggering along under the weight of Tallman in the face of the biting wind and blinding snow that drifted along the road, no one knows. Yet in spite of the danger and terrible cold Brown struggled courageously on until panting and nearly frozen he deposited his crippled companion in a place of warmth and safety. It is of such stuff as this that the men are made, who, in the face of death and danger, have saved the country on the battle field by their bravery. Conductor Brown deserves the admiration of every one for his heroic act.—*Leavenworth (Kan.) Times*.

Hard Luck.

Uncle Rastus was arrested for stealing coal from the railroad yard:
Magistrate: "Don't you know, Uncle Rastus, that stealing never pays? You are sure to be found out some time."
Uncle Rastus: "Yes, yo Honah, but I had ha'd luck."
Magistrate: "Hard luck?"
Uncle Rastus: "Yes, Sah. When an old black man like myself can't steal coal on a dark night without somebody seein' him he's in ha'd luck. 'Deed he is, yo Honah."—*Exchange*.

A Lost Road.

On the morning of Jan. 24, about 60 feet of the road-bed of the Shenandoah Branch of the Philadelphia & Reading road, near Shenandoah, Pa., sank about two feet while a coal train was passing over it, and a short time afterward the surface dropped into the working of a coal mine below, leaving a hole 75 ft. in length. An attempt was made to fill up the cave, but as the track continued to sink at various points it became necessary to abandon the work and to wait until the caving ceased and some bottom could be found. At latest accounts the attempt to fill in the cave had been renewed, with some prospect of success.

An Old Employee.

Mr. John Riley, of New Milford, Conn., was first employed on the Housatonic Railroad some 45 years ago as a laborer in the construction of the road. When the line was completed to New Milford, Conn., on July 7, 1841, he was made depot baggage-master at that place, and has held the position ever since. From the time of his appointment up to 1890 he did not lose a single day's service in the employment of the company. He is now about 60 years old, and is an unusually active man and in good health, and attends punctually to his duties. Few employes can show a longer continuous period of service.

A Lion in the Cab.

A weird and terrible tale comes from Montana, where the engineer and fireman of a train on the Utah & Northern road tell how the cab of their locomotive was invaded by a mountain lion, which sprang upon the foot-board as the train was passing through a cut and at once took full possession. The invader continued to run the train until the engineer conceived the happy idea of blowing the whistle. This was too much for him, and so alarmed him that he leaped from the cab, much to the relief of its rightful occupants. The train, however, had shortly before made a long stop at Butte, and the engineer who tells the tale does not say how much Montana whisky had been taken aboard at that station. A fuller statement on this point may tend to throw some doubt upon his thrilling tale. At any rate, the presence of the invader was certainly a warning to reform, whether the lion was really present in the flesh or not.

How the Railroad Men Flirt in the Shenandoah Valley.

At Big Spring an enormous mountain has seated itself within a hand's breadth of the river. The cars glide by on the other side of the stream, and it really seemed as if there were not room between the water and the hill for a house; but the house stood there as though its rear timbers were against the everlasting rock behind it. Not a yard away in front was the river, and moored upon it a small raft, covered with yellow mud, telling pathetically of the way the dwellers there reached the settlement, through which we were passing. The rocky steep shut them in on the west, the turbid stream ran in front of them. We halted at the station, and as I looked from the car window the figure of a young girl appeared at the door of the house across the river. She was but two or three rods away, and I could see her plainly. The lithe, slight form was in the full sunlight. In the interest of romance, and for the sake of the fitness of things here in this lovely valley, I want to write that there was a certain untamed beauty in the aspect of the girl, who, after staring an instant at the train, stepped out into the raft and seized a pole which lay on the bottom of it. But she was not pretty, she was not interesting, save in a kind of agility and freedom of movement; she was heavy-featured and unkempt, still at a distance the picture she made in front of the house and the mountain was decidedly attractive. I noticed that she was looking at a particular place in the long line of cars, and with curiosity I looked at the same spot, for the great curve in the road made it possible for me to see the engine. The raft was suddenly

propelled into the middle of the river, and slid up toward the locomotive. The girl leaned on her pole with one hand, put the other to the side of her mouth, and shrieked: "Nick! I say, Nick!" in a voice that a sailor might have used in a gale. Every occupant of our car heard her and started. I kept my eyes on the engine, for I believed Nick was there, and that, if alive, he also would hear. I was right. He did hear. A blackened fireman swung himself out on the step, grinned broadly as he saw the girl on the raft, waved a dingy band at her, and called out something which I could not distinguish. The girl's face lightened as much as such a stolid face could; she lifted her pole as if it had been a fan, and swung it in the air, her raft reeling as she did so.

"Good gracious!" cried a dashing New York damsel near me, who had also been watching—"good gracious! Is that a flirtation?"

I thought the speaker looked as if she knew a great deal more about flirtation than I, so I did not answer her. The train moved on slowly, the girl on the raft planting her pole firmly in the mud at the bottom of the water, and gazing faithfully at Nick as long as he was in the line of her vision.—*Correspondence New York Evening Post*.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Philadelphia & Erie, annual meeting, at the office in Philadelphia, Feb. 8.
Illinois Central, annual meeting, at the office in Chicago, March 10.
Huntingdon & Broad Top Mountain, annual meeting, at the office in Philadelphia, Feb. 2.
St. Louis & Cairo, special meeting, to vote on the question of leasing the road to the Mobile & Ohio, in New York, March 15.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Eastern Illinois, 2½ per cent., payable March 1, to stockholders of record on Feb. 13. The last dividend was 3 per cent., paid March 1, 1882.
Rutland, 0½ per cent. on the preferred stock, payable Feb. 1, to stockholders of record on Jan. 20. The last dividend was 1 per cent., paid Aug. 1, 1885.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *American Institute of Mining Engineers* will hold its next meeting in Pittsburgh, beginning on Tuesday, Feb. 16.
The *Master Car-Builders' Club* will hold its regular monthly meetings through the winter at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its monthly meetings at its rooms in the Boston & Albany passenger station in Boston, on the evening of the second Wednesday in each month.

The *Western Railway Club* will hold its regular monthly meetings at its rooms, No. 103 Adams street in Chicago, on the third Wednesday in each month.

Transportation in Congress.

The Secretary of the Treasury has sent a communication to the House inviting attention to the present condition of the Union Pacific and Central Pacific companies' sinking fund. He says the moneys which have from time to time accrued to the fund on account of government transportation and interest on invested bonds, together with cash payments, amount to \$6,052,340 in the case of the Union Pacific, and \$3,177,566 in the case of the Central Pacific. The amounts invested in United States bonds are, for the Union Pacific, \$5,823,539, and for the Central Pacific, \$2,276,963, leaving an uninvested balance of \$228,800 for the Union Pacific, and \$800,602 for the Central Pacific. He recommends a modification of the act of March 7, 1878, that will authorize the Secretary of the Treasury to invest the sinking fund in other than government securities.

In the Senate on Jan. 25:

Mr. Hoar (Massachusetts), from the Judiciary Committee, reported a bill to provide for the payment of the indebtedness of the Pacific railroad companies to the United States. In brief, the bill provides that the amount of the respective indebtedness of the Union Pacific, the Kansas Pacific, the Central Pacific, the Central Branch Union Pacific, the Sioux City & Pacific and the Western Pacific companies shall be ascertained, and the companies shall be authorized to make and deliver to the Secretary of the Treasury each 160 bonds of redemption bearing date Oct. 1, 1886, one of which bonds shall mature on April 1, 1887, and one thereafter at the expiration of each successive period of six months from that date, the sum of said bonds to be ascertained by adding to computed indebtedness interest at the rate of 3 per cent. per annum from said first day of October to the average date of maturity of said bonds. Another section directs the Secretary of the Treasury to require either of said companies to pay out of any balance of net income left in any year after the requirements of this act have been complied with, and after payments of dividends not exceeding 6 per cent. per annum on the capital stock of such company, such sum of money not exceeding 10 per cent. of such balance of net income.

On Jan. 26 the sub-committees of the Senate and House committees on commerce gave a second hearing to parties interested in the construction of the Baltimore & Ohio's proposed bridge over the Arthur Kill. A number of arguments were presented against the construction of the bridge, while other persons argued in favor of a requirement that the bridge shall be at least 70 ft. above water. Argument for the company was presented by Mr. Cowen. It is understood that no further hearing will be given before the committee makes its report.

Association of Railroad and Steamship Agents of Boston.

A meeting of railroad and steamship agents, resident in Boston was held in that city Jan. 23, about 70 gentlemen being present. After a general discussion it was resolved to form a permanent society to be known as the Association of Railroad & Steamship Agents of Boston. A constitution and by-laws were adopted and officers were elected, as noted elsewhere.

New England Railroad Club.

The subject for discussion at the next meeting of the Club, Feb. 10, 1886, will be, as noted last week, "The Relation of the Roadway to the Rolling Stock, and the methods, forms and materials best adapted for use in their construction."

This subject will be considered jointly by the New England Railroad Club and the Boston Society of Civil Engineers. Engineers and others interested in maintenance of way, as well as Master Mechanics, Master Car-Builders and others interested in rolling stock are especially invited to be present.

Baltimore & Ohio Employees' Relief Association.—The December sheet of this Association shows the payments of benefits to members during the month as follows: Main Stem Transportation Department, 134; Machinery Department, 128; Road Department, 88; Baltimore & Philadelphia, 2; Trans Ohio Division, 171; Pittsburgh Division, 78; Physician's bill, 130. Total, 731.

The largest payments were \$1,500 to the widow of Jarvis Dickinson, foreman in the road department, accidentally killed, and of \$1,000 to the widow of Charles W. Gooley, brakeman, also accidentally killed.

The order directing assistant medical examiners to exercise supervision over the company's property of all description and to note and report everything affecting the sanitary condition is extended so as to include all examiners of the Association.

Savannah, Florida & Western Employees' Benevolent Association.

The annual meeting of this association was held in Savannah, Ga., Jan. 19. The association was reported in a prosperous condition, with an increasing membership. It is composed of employees of the Savannah, Florida & Western and the Charleston & Savannah roads. A committee, of which General Manager H. S. Haines was chairman, presented a long report in favor of the establishment of a co-operative store for the benefit of the employees. This report was thoroughly discussed and resolutions were adopted recommending the establishment of branches of the association at the principal points on the road outside of Savannah, and also recommending the establishment of a co-operative store on the basis proposed by the committee, and finally the establishment of a loan department in connection with the association.

ELECTIONS AND APPOINTMENTS.

Association of Railroad & Steamship Agents of Boston.—This Association has been organized with the following officers: President, J. W. Richardson, of the Stonington Line; Vice Presidents, H. H. Marshall, F. A. Wellington, H. H. Palmer, William Garty and C. A. Brown; Treasurer, A. T. Kimball; Secretary, L. E. Challenor; Executive Committee, S. W. Manning, Warren E. Locke, Alfred Hawkins, W. C. Tallman, C. H. Wise, H. D. Cochrane, E. E. Currier, M. T. Dennis.

Atlantic & Pacific.—Mr. H. C. Bush has been appointed General Agent in San Francisco.

Baltimore & Cumberland Valley.—At the annual meeting in Chambersburg, Jan. 14, the following officers were chosen: President, David Mill, Gettysburg, Pa.; Directors, W. L. Chambers, John P. Culbertson, Chambersburg, Pa.; George B. Cole, John W. McPherson, Shippensburg, Pa.; Charles Humrichouse, Augustus Reimann, Hagerstown, Md.; D. J. Foley, J. M. Hood, Baltimore. Secretary, Thaddeus M. Mahon, Chambersburg, Pa. Treasurer, D. J. Foley, Baltimore.

Buffalo & Geneva.—The directors of this new company are: Wilson S. Bissell, F. H. Goodyear, J. Wesley Bridgman, H. H. Barker, A. D. Bissell, Franklin Lee, Buffalo, N. Y.; W. W. Wright, Stewart S. Cobb, Jos. S. Lewis, Geneva, N. Y.; M. A. Wilbur, Victor, N. Y.; S. D. Jackson, Clifton Springs, N. Y.; J. R. Pratt, Manchester, N. Y.; Howard Elmer, Waverly, N. Y. The board has elected Wilson L. Bissell, President; Wm. W. Wright, Vice-President; George M. Diven, of Elmira, N. Y., Secretary; Howard Elmer, Treasurer.

Carolina, Cumberland Gap & Chicago.—Col. R. E. Bowers, of Barnwell, S. C., has been chosen President in place of Mr. Johnson Hagood, resigned.

Central, of New Jersey.—Mr. George R. McKenzie, of New York, has been chosen a director in place of Mr. Robert Garrett, resigned.

Chicago, Burlington & Northern.—Mr. D. Coleman has been appointed Superintendent, with headquarters at La Crosse, Wis., and will take charge of construction work on the road on Feb. 3. Mr. Coleman has for some time been Roadmaster on the Atchinson, Topeka & Santa Fe, with office at Topeka, Kan., and has made there an excellent record for efficiency in his department.

Chicago, Burlington & Quincy.—Mr. H. T. Mack has been appointed Division Freight Agent for the St. Louis Division, to date from Feb. 1. His office will be in Rock Island, Ill., to which place the division offices will be removed from St. Louis.

Chicago, Calumet & Eastern.—This new company has elected Edwin L. Gillette, President; S. Montgomery Smith, Vice-President; B. R. De Young, Secretary and Treasurer, Henry Hudson, General Solicitor.

Chicago & Northwestern.—Mr. W. B. Linsley has been appointed Superintendent of the Peninsula Division, with office at Escanaba, Mich., in place of W. F. Fitch, transferred. Mr. Linsley was formerly Superintendent of this division, but two years ago was placed in charge of the Sioux City & Pacific and the Fremont, Elkhorn & Missouri Valley roads. He is now returned to his old division at his own request.

Cleveland & Canton.—President H. A. Blood will hereafter act as General Manager also in place of S. Briggs, resigned. Mr. J. W. Wardwell (late with the Concord Railroad) is appointed Superintendent, with office in Cleveland, Ohio.

Cleveland, Columbus, Cincinnati & Indianapolis.—Mr. H. McK. Twombly has been chosen a director in place of Wm. H. Vanderbilt, deceased.

Columbus, Hope & Greensburg.—This company has elected M. E. Ingalls, President; Horace Scott, Vice-President; E. F. Osborne, Secretary and Treasurer.

Delaware.—At the annual meeting in Dover, Del., Jan. 15, the old directors were re-elected, and subsequently chose Samuel M. Felton, President; Manlove Hayes, Secretary and Treasurer.

Duluth, St. Cloud & Denver.—The officers of this new company are: President, H. J. Rosenberger; Vice-President, F. E. Baldwin; Secretary, O. W. Baldwin; Treasurer, J. M. Rosenberger. Office in St. Cloud, Minnesota.

Fitchburg.—At the annual meeting in Boston, Jan. 26, the old directors were re-elected, as follows: Charles T. Crocker, Rodney Wallace, Fitchburg, Mass.; Franklin N. Poor, Somerville, Mass.; Seth Bemis, Newton, Mass.; Robert Codman, E. B. Phillips, Charles A. Welch, Boston. The board re-elected E. B. Phillips President; Thomas Whittemore, Clerk; Mason D. Benson, Treasurer.

Franklin Institute.—At the annual meeting in Philadelphia last week Colonel Charles H. Banes was elected President to succeed Wm. P. Tatham, who had declined renomination. Frederick Graff was re-elected Vice-President, William H. Wahl, Secretary; Samuel Sartain, Treasurer, and William

A. Cheyney, Auditor. Managers Persifer Frazer, Wm. Helme, Edwin J. Houston, Enoch Lewis, William P. Tatham, William H. Thorne and John J. Weaver were re-elected, and George V. Cresson was elected a manager to succeed Frederick Fraley, who had declined renomination.

Galveston, Houston & Henderson.—At the annual meeting in Galveston, Tex., Jan. 12, the following directors were chosen: James A. Baker, W. P. Ballinger, Jay Gould, J. Herrin, Oscar G. Murray, F. A. Rice, D. S. H. Smith. The road is leased to the Missouri Pacific.

Galveston, Sabine & St. Louis.—At the annual meeting in Longview, Tex., Jan. 15, there were 4,454 shares represented out of a total of 4,500 of record, and the following directors were chosen: R. R. Chaney, J. P. Gibbons, C. T. Renfro, Peter Vandewater, J. H. McCaully, W. Alexander Abey, James Turner, Samuel Cundiff, Brad. Barner. At a subsequent meeting the board elected Brad. Barner President and General Manager; James Turner, Vice President; Samuel Cundiff, Secretary and Treasurer; Peter Vandewater, Chief Engineer.

Mr. John M. Duncan, the new Receiver, has appointed C. W. Booth General Manager; W. W. Wood, General Freight and Passenger Agent. Offices at Longview, Texas.

Jacksonville, Tampa & Key West.—The following circular from General Manager G. W. Bentley is dated Jacksonville, Fla., Jan. 15:

"The Jacksonville, St. Augustine & Halifax River Railway has become a part of the Jacksonville, Tampa & Key West Railway system and will be known hereafter as the St. Augustine Division, W. L. Crawford, Superintendent.

"The Atlantic Coast, St. Johns & Indian River Railway has been leased by this company and forms with the branch from Enterprise Junction to Enterprise, the Indian River Division, W. S. Sneden, Superintendent.

"Mr. M. R. Moran is appointed General Superintendent of the Jacksonville, Tampa & Key West Railway system, with headquarters at Jacksonville. He will have special charge of the operation of the Jacksonville, Tampa & Key West and the Palatka and Indian River roads (Jacksonville to Sanford) and in the absence of the General Manager, or when he cannot be readily consulted, will have authority to advise and, if occasion requires, direct the division superintendents in all matters relating to the making of time schedules and operating the roads. As General Passenger and Freight Agent, his authority will cover the main line and all divisions.

"Mr. W. L. Crawford, as Superintendent of the St. Augustine Division (J. St. A. & H. R. Ry.), with headquarters at Jacksonville, will have special charge of the operation of that division and of the ferries at Jacksonville, subject to the orders of the General Manager, or, in his absence or any special emergency, of the General Superintendent.

"Mr. W. S. Sneden, (with headquarters at Enterprise until the line is completed to Sanford and then at Sanford), as Superintendent of the Indian River Division (A. C. St. J. & I. R. Ry.) will have special charge of the operation of that division and of the Enterprise Branch. He will also have authority to direct the employees at and south of Enterprise Junction in all matters not inconsistent with the instructions of the General Superintendent and will have charge of all the property at and south of Enterprise Junction.

"Mr. L. C. Deming is Assistant General Passenger Agent (with office at Jacksonville), his authority covering the main line and all divisions. Ticket reports and application for rates should be sent to him.

"Mr. L. E. Barker is Assistant General Freight Agent (with office at Jacksonville), his authority extending over main line and divisions. Freight reports and claims should be sent to him. Mr. Barker will also act as Train Dispatcher for that portion of the line between Jacksonville and Sanford."

Kansas City, Des Moines & St. Paul. The officers of this new company are: F. M. Gilbert, President; Foshay Walker, Secretary. Office in Des Moines, Iowa.

Little Rock & Hot Springs.—The directors of this new company are: J. N. Conger, M. N. Pierce, Hot Springs, Ark.; J. M. Moore, C. N. Rockafellow, Little Rock, Ark.; Joseph Reynolds, Chicago.

Marietta & North Georgia.—Mr. R. M. Pulsifer, of Boston, has been chosen President in place of Joseph Kinsey, resigned.

Maryland Central.—The Maryland Circuit Court has appointed Messrs. Wm. Gilmore and Samuel Spencer Receivers in place of Mr. J. C. Wrenshall, relieved at his own request.

Memphis, Birmingham & Atlantic.—The following circular from Vice-President T. C. Leake, Jr., is dated Memphis, Tenn., Jan. 19: "Col. W. P. Dunavant having resigned the Superintendency of this railroad, the duties of which office he only consented to perform temporarily, Mr. J. P. Meredith is hereby appointed in his stead, and will assume charge as Superintendent from this date. His orders will be obeyed and respected accordingly."

Michigan General Passenger Agents' Association.—At the annual meeting in Grand Rapids, Mich., Jan. 21, this association elected W. A. Carpenter, President; F. T. Whitney, Vice-President; George E. King, Secretary.

Nevada Central.—This company, which is controlled by the Union Pacific, has elected Charles Francis Adams, Jr., President; S. R. Callaway, Vice-President; C. W. Hinchcliffe, Secretary and Treasurer.

New York, Lake Erie & Western.—Mr. H. B. Chamberlain, Chief Clerk Freight Claims Office, is appointed Freight Claim Agent of this road and leased lines, with office at 21 Cortlandt street, New York. On and after Jan. 1, 1886, all claims (except coal) heretofore sent to Mr. G. G. Cochran, General Freight Agent, New York, Pennsylvania & Ohio, Cleveland, O., and to Mr. A. H. Ward, formerly General Eastern Agent, 401 Broadway, New York, should be addressed to Mr. Chamberlain, as above.

Northern Pacific.—Mr. George S. Marsh, late Chief Clerk, has been appointed Assistant General Ticket Agent. Mr. H. C. Davis continues Assistant General Passenger Agent.

Pennsylvania.—Mr. J. A. Anderson has been appointed Superintendent of the new Relief Department, and Mr. Holmes D. Ely, Assistant Superintendent; their offices will be at Trenton, N. J. Mr. Anderson has been for many years Superintendent of the Belvidere Division, and has given much attention to the questions involved in the relations between the company and its employees.

Robert A. Shirrefs has been appointed Superintendent of Grain Elevator at Jersey City, vice J. W. Galbreath, to take effect Feb. 1.

Philadelphia & Erie.—The Philadelphia City Council has elected E. A. Gaskill, Charles A. Heberton and Henry P. Shultz city directors in this company.

Rochester & St. Paul.—The directors of this new company are: M. J. Daniels, T. L. Fishback, D. H. Williams, Rochester, Minn.; T. Cochrane, Jr., W. B. Dean, W. Lindeke, D. H. Moon, St. Paul, Minn.

St. Catharines & Niagara Central.—At the annual meeting in St. Catharines, Ont., Jan. 25, the old officers were re-elected, as follows: President, Dr. Lucius S. Oille; Vice-President, Patrick Larkin; directors, Wm. W. Greenwood, Nelson Haight, Henry A. King, Edward A. Smyth, Richard Wood; Secretary, Richard Wood.

St. Paul, Fort Snelling & Minneapolis.—The office of this new company is in St. Paul, Minn.; the directors are F. B. Clarke, Kimble P. Cullen, Wm. Dawson, Jr., James P. Gribben, Wm. Hamm, Albert Scheffer, T. L. Schurneier and John J. Watson.

St. Louis & San Francisco.—Mr. T. W. Lillie, for many years Secretary and Treasurer, has been chosen Second Vice-President of this company.

San Francisco & North Pacific.—This company has elected James M. Donahue, President, in place of Peter Donahue, deceased; Henry C. Whiting, Vice-President; J. H. von Schroeder, Treasurer; T. W. Johnston, Secretary.

Savannah, Florida & Western Employees' Benevolent Association.—At the annual meeting in Savannah, Ga., Jan. 19, the following officers were chosen: President, F. Eugene Durbin; Vice-President, E. Geffcken; Secretary and Treasurer, James Gallagher; Finance Committee, A. A. Averill, J. D. Reynolds and H. Ulme.

Soldier Run.—Mr. Simon B. Elliott, of Dubois, Pa., is President of this new company.

Southern Pool.—Mr. J. R. Ogden, now General Freight Agent of the East Tennessee, Virginia & Georgia, has been selected as Commissioner of the new Southern Pool.

Toledo & Ohio Central.—Mr. John F. Cline is appointed Acting Treasurer of this company, with office at Toledo, Ohio.

Utica, Clinton & Binghamton.—This company, whose road is leased to the Delaware & Hudson Canal Co., has re-elected James I. Scollard President; George P. Phelps, Vice-President; R. S. Williams, Secretary and Treasurer.

Vernon, Greensbury & Rushville.—This company has re-elected M. E. Ingalls President; Horace Scott, Vice-President; E. F. Osborne, Secretary and Treasurer.

Western Society of Engineers.—The officers elected at the annual meeting to serve for the ensuing year are as follows: President, A. W. Wright; First Vice-President, C. H. Hudson; Second Vice-President, D. J. Whittemore; Secretary, L. P. Morehouse; Treasurer, Charles Fitzsimons; Librarian, G. A. M. Liljencrantz; Trustees, S. G. Artungstall and A. Gottlieb.

Zanesville, Mt. Vernon & Marion.—The officers of this new company are: President, Albert E. Boone; Vice-President, Abner P. Pinkerton; Secretary, Rufus C. Burton; Auditor, John Bane; Treasurer, Frank N. Wedge; Chief Engineer, John B. Yates. Office in Zanesville, Ohio.

PERSONAL.

—Mr. R. P. Staats has resigned his position as Roadmaster of the Eastern Division of the New York, Lake Erie & Western road, to date from Feb. 1 next.

—Mr. Joseph Kinsey has resigned his position as President of the Marietta & North Georgia Railroad Co., and it is understood that he has sold out his interest in the road.

—Ex-Governor John C. Brown will, it is understood, resign his position as General Solicitor of the Missouri Pacific Co., in order to give his attention to his duties as Receiver of the Texas & Pacific road.

—Mr. Samuel Briggs has resigned his position as General Manager of the Cleveland & Canton Railroad. Mr. Briggs has been in charge of the road for several years, as Superintendent, Receiver and General Manager.

—Mr. J. C. Wrenshall has been relieved at his own request from the duties of Receiver of the Maryland Central road. The Court granted his request with reluctance, desiring him to continue in charge of the road if possible.

—Mr. Johnson Hagood has resigned his position as President of the Carolina, Cumberland Gap & Chicago Co. It is understood that he resigned because there is no present prospect that the company will be able to build its projected line.

—Major W. W. Vass, on the occasion of his fortieth anniversary of his appointment as Secretary and Treasurer of the Raleigh & Gaston Railroad Co., has been presented by the company with a valuable set of silver ware, in recognition of his long and faithful services.

—Mr. Charles Paine, Past President of the American Society of Civil Engineers, has resigned his position as Second Vice-President of the New York, Lake Erie & Western Railroad Company to accept the position of Vice-President of the "Philadelphia Company," which owns most of the natural gas properties at Pittsburgh, and of which Mr. George Westinghouse is President. Mr. Paine leaves with regret his position on the Erie, where his duties and his associates were congenial, but the gas company, which seems likely to become one of the greatest enterprises in the country, made it for his advantage to go.

—We regret to announce the death on Jan. 19 of Mr. F. W. Richardson, of Troy, N. Y. Mr. Richardson, though quite a young man, was well known as the patentee and manufacturer of a very important and successful improvement in locomotives, the Richardson balanced slide valve. Mr. Richardson inherited his mechanical skill, his father, Mr. G. W. Richardson being the patentee of a well-known form of safety valve. Having learned the trade of a machinist while young, the subject of our notice was for some years engaged in the United States light-house service, and erected the fog syrens at Block Island and other places. Mr. Richardson was widely known amongst railroad men, and was much liked and respected both for his amiable and genial qualities and his great mechanical ability.

TRAFFIC AND EARNINGS.

New York State Canals.

The report of Superintendent of Public Works Shanahan to the New York Legislature gives the ordinary repairs and expenses of the state canals for 1885 at \$694,280. For improving the Champlain Canal the sum of \$122,228 was expended.

The canals were opened May 11 and closed Dec. 1. Tonnage May 6 to Dec. 1, 1884..... 5,009,488 Tonnage May 11 to Dec. 1, 1885..... 4,731,784

Decrease, 1885..... 277,704

The decrease was due principally to a decreased export demand for grain and the railroad rate war. During navigation, however, four times as much grain was transported from Buffalo over the canals as over all the railroads combined.

The season was an extraordinary one, no breaks. The water on the different levels was of uniform depth, and heavy rainfalls gave abundant water. Increased storage, how

ever, is still a necessity. The expenditure for improving the Hudson River up to Dec. 31, was \$29,860. High water prevented the completion of the new dyke opposite New Baltimore, and the work of dredging at Troy. The required depth of water was maintained from Troy to Coxsackie.

The experiment of enlarging lock 50, Erie Canal, so as to permit two boats to be locked at the same time proved a success. The Superintendent suggests that the locks at Port Byron, Jordan and Syracuse be next enlarged. This, he says, would do away with the necessity of uncoupling double-headers between Lyons and Utica, a distance of 107 miles. The Superintendent renews his recommendations of the previous year for an increased water supply. He also suggests the restoration of the towpath to its original form. During the season 100 miles of towpaths were graveled. The accretion of silt at the bottom of the canal interferes with navigation. The removal of this is recommended and the restoration of the original depth of water, 7 ft. For doing this work the Superintendent recommends that \$100,000 be re-appropriated from the unexpended balance from former years of the ordinary repair fund, now in the State Treasurer's hands.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Year to Dec. 31:	1885.	1884.	Inc. or Dec.	P. c.
Balt. & Potomac	\$1,223,091	\$1,224,572	I.	\$98,519 8.0
Net earnings	324,240	385,033	I.	168,907 43.8
Ches. & Ohio	3,322,040	3,538,635	I.	216,595 6.0
Ches., O. & S. W.	1,567,765	1,374,645	I.	193,120 14.1
Des. M. & Ft. D.	382,420	354,032	I.	28,388 8.0
Net earnings	120,420	101,663	I.	18,757 18.4
Gulf, Col. & S. F.	1,826,761	1,727,585	I.	99,166 5.7
Kentucky Cent.	842,051	922,107	D.	80,056 8.7
Mexican National	1,534,144	1,581,821	D.	47,677 3.0
Nash., Chatta. & St. L.	2,134,527	2,358,682	D.	224,155 9.5
Net earnings	860,138	1,015,739	D.	155,601 15.3
N. Y., Sus. & W.	1,092,354	1,034,210	I.	58,144 5.6
Northern Cen.	5,490,922	5,511,877	D.	30,955 0.6
Net earnings	2,235,308	2,653,484	I.	418,176 18.7
Pennsylvania	45,615,034	48,539,918	D.	2,924,884 6.1
Net earnings	16,135,269	18,039,902	D.	1,904,633 11.9
Phila. & Reading	29,230,543	30,972,100	D.	1,741,557 5.6

Eleven months to Nov. 30:
Oreg. Short Line, \$1,077,726
Net earnings, 528,066

Month of November:	1885.	1884.	Inc. or Dec.	P. c.
Oregon Improvement Co.	\$235,307	\$305,057	D.	\$69,750 29.8
Net earnings	50,768	104,597	D.	53,829 51.5
Oreg. Short Line	177,800	193,939	D.	16,139 8.3
Net earnings	48,475	135,172	D.	86,697 64.2
St. Jo. & Grand Island	102,913	87,309	I.	15,604 18.0
Net earnings	44,354	40,495	I.	3,859 9.6

Month of December:	1885.	1884.	Inc. or Dec.	P. c.
Balt. & Potomac	\$107,845	\$100,137	I.	\$7,708 7.0
Net earnings	32,829	16,927	I.	15,902 210.1
Ches. & Ohio	275,000	308,012	D.	33,012 11.0
Ches., O. & S. W.	144,196	138,278	I.	5,918 4.3
Des. M. & Ft. D.	35,000	29,435	I.	5,565 18.9
Net earnings	17,603	6,288	I.	11,315 182.8
Gulf, Col. & S. F.	205,880	142,048	I.	63,832 45.0
Kentucky Cent.	55,000	66,730	D.	11,730 17.5
Mexican National	129,685	125,031	I.	4,654 3.7
Nash., C. & St. L.	193,327	197,512	D.	4,185 2.1
Net earnings	74,812	81,759	D.	6,947 11.7
N. Y., Sus. & W.	86,405	87,686	D.	1,281 1.5
Northern Central	507,099	412,269	I.	94,830 23.0
Net earnings	221,254	89,230	I.	132,024 149.0
Pennsylvania	4,046,081	3,769,327	I.	276,754 7.4
Net earnings	1,359,200	1,096,229	I.	262,971 24.0
Phila. & Reading	2,592,529	2,315,563	I.	276,966 11.9
Net earnings	1,186,402	921,011	I.	265,391 28.8

Second week in January:	1885.	1884.	Inc. or Dec.	P. c.
C. I. St. L. & C.	\$34,857	\$47,966	D.	\$13,109 27.0
Kansas City, Ft. Scott & Gulf	34,470	50,721	D.	16,251 31.4
Kan. City, Spr. & Mem.	13,961	35,926	D.	21,965 61.0
Long Island	36,844	38,710	D.	1,866 4.8

Third week in January:	1885.	1884.	Inc. or Dec.	P. c.
Buff. R. & Pitts.	\$24,211	\$19,980	I.	\$4,231 21.2
Canadian Pacific	101,000	80,000	I.	21,000 26.3
Chi. & Alton	140,341	156,107	D.	15,766 11.2
Chi. & East. Ill.	36,230	29,957	I.	6,273 20.9
Chi. Mil. & St. P.	349,000	334,702	I.	14,298 4.2
Chi. & Nor. West.	319,700	314,600	I.	5,100 1.6
Ch. St. P. M. & O.	81,100	74,000	I.	7,100 9.6
Denver & R. G.	97,191	91,527	I.	5,664 6.1
Louisv. & Nashv.	250,395	253,640	D.	3,245 1.3
Mil. L. S. & W.	23,535	16,555	I.	7,980 48.8
St. L. & San F.	64,400	55,600	I.	8,800 15.7

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending Jan. 16 are reported as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Anthracite	505,781	467,785	I.	42,996 9.3
Eastern bituminous	119,730	133,517	D.	13,787 10.3
Coke	37,363	41,275	D.	3,912 9.5

The Southwest Virginia Improvement Co. shipped over the Norfolk & Western road from its Pocahontas and Flat Top mines in the year ending Dec. 31 last 512,603 tons of coal. An increased output is expected this year, and the company has already secured several large contracts for coal.

Pennsylvania Railroad coal tonnage for the week ending Jan. 16 was:

	Coal.	Coke.	Total.	1885.
Line of road	101,709	37,077	140,786	174,085
From other lines	44,124	286	44,410	57,988

Total, 147,833 37,363 185,196 232,073
Year to Jan. 16, 340,818 121,754 462,572 666,949
Decrease for the week, 46,877 tons, or 20.2 per cent.; decrease for the year, 204,377 tons, or 30.6 per cent.

Pennsylvania Railroad coal tonnage for the week ending Jan. 23 was:

	Coal.	Coke.	Total.	1885.
Line of road	149,580	60,522	210,102	158,694
From other lines	75,964	1,378	77,342	51,976

Total, 225,544 61,900 287,444 210,670
Year to Jan. 23, 560,362 183,554 743,916 877,619
Increase for the week, 76,674 tons, or 36.5 per cent.; decrease for the year, 127,703 tons, or 14.5 per cent.

Cumberland coal shipments for the week ending Jan. 23 were 27,296 tons. Total to Jan. 23 this year, 115,074; last year, 112,880; increase, 2,194 tons, or 1.9 per cent.

Petroleum.

The production and shipments of the Pennsylvania and New York oil wells for December are given by *Stonell's Petroleum Reporter* as follows, in barrels of 42 gallons:

	1885.	1884.	Inc. or Dec.	P. c.
Production	1,898,657	1,822,614	I.	76,043 4.2
Shipments	2,138,253	2,282,244	D.	243,991 10.2
Stock, Nov. 30	34,428,841	37,308,136	D.	2,879,295 7.9

The production was the largest reported for any month of

1885. Of the total the Allegheny District in New York furnished 12.0 per cent.; the Bradford District in Pennsylvania 38.1; the Warren District 12.0 and the Lower District 37.9 per cent.

The stock decreased 239,596 barrels during the month, that being the excess of shipments over production.

There were 345 new wells completed during the month and 42 dry holes developed. There were 277 new wells under the drill at the close of the month, with preparations to drill 249 others in progress.

The total shipments for 1885 were 23,713,326 barrels, against 33,657,599 in 1884, 21,979,369 in 1883 and 21,900,314 in 1882. The year showed no material increase over 1884, but maintained the increase over 1883 gained in that year.

The total shipments for the month were as follows, in barrels:

	Crude.	Refined.	Total.	P. c.
New York	567,582	96,586	664,168	31.1
Philadelphia	511,914	149,804	661,718	31.0
Baltimore	57,867	30,519	88,386	4.1
Boston	23,889	72,465	96,354	4.5
Cleveland	255,213	255,213	510,426	11.9
Pittsburgh	80,787	85,787	166,574	4.0
Local points	199,554	87,043	286,597	13.4
Total	1,701,806	436,447	2,138,253	100.0

In this statement the refined oil is that refined at the Creek refineries in the oil district; it is reduced to its equivalent in crude, so that the totals express the entire amount of crude oil shipped to each point named, whether in crude or in refined form. The oil refined at Creek refineries was 20.4 per cent. of the total shipments.

Chicago, St. Louis & Missouri River Association.

A meeting was held in Chicago last week at which an attempt was made to settle disturbing questions. An understanding was reached in relation to commissions on business and sales of tickets to outside offices. The Association refused to apply the rules governing business to Omaha, Kansas City and other Missouri River points to Northwestern territory (including St. Paul and Minneapolis), and the Chicago, Milwaukee & St. Paul accordingly gave notice of withdrawal.

Central Traffic Association.

The following summary is published of the agreement made in Cincinnati last week by the general passenger agents of the roads forming this Association, subject to the approval of the general managers:

"This association is formed for the purpose of a convenient and economical transaction of passenger business; the maintenance of agreed tariffs, and for the prevention of ruinous competition and unjust discrimination. The organization thus made is to be entitled The Central Traffic Association Passenger Committee.

"Earnings to be divided as follows: A sum equal to the constructive gross earnings of the companies of lines accruing west of the western terminus of the trunk lines, from all the passenger business (except immigrants) transported between all points hereinbefore described, computed at full and uniform tariff rates, shall be divided between the parties to this compact in the proportion which may be agreed upon, or, in case of failure to agree, which may be finally decided by arbitration under the rules of this committee, it being understood by the committee that special fares for special occasions which may be authorized by this committee shall be reported for division at the special fare authorized; but such differential fares as may be authorized, made for the purpose of diversion of traffic to a particular line, shall be computed at full tariff in the division of earnings between the companies or lines in the committee.

"The business to be divided between the parties to the agreement is that between the Western terminus of the trunk lines and Chicago, St. Louis, Cincinnati, Louisville, Indianapolis, Logansport, Fort Wayne, Lafayette, Bloomington, Ill.; Cleveland, Toledo, Columbus, Dayton, Springfield, O.; Detroit, Mich., and points beyond via either of the above-named cities and between such other points as may be agreed upon.

"The volume of the traffic is to be divided among the parties to the agreement as far as practicable, in such proportion as will enable each line to earn its allotted proportion of the receipts.

"Regarding the diversion of traffic, the agreement proposes that companies or lines or parties thereto having connections or routes for passenger traffic not covered by the terms of the agreement, but which compete for traffic which may be transported by routes, parties to the agreement, shall not take any measures to divert the traffic to such outside connections or routes, but shall use all proper and reasonable means to protect and increase the aggregate earnings to be divided under the terms of the agreement.

"The agreement provides for a Chairman of the Passenger Committee, who shall also act as Secretary.

"Whenever any question arises regarding the proportion to be enjoyed by each company or line under the agreement for the division of passenger business concerning which the interested parties cannot agree, it shall, upon the application of either of them, be submitted to the arbitrator under the rules provided for such cases.

"The matter of differentials is left almost wholly to the judgment of the Chairman. The Chairman also has complete control of commissions for ticket agents, reduced fares, rebates, etc., to influence through passenger business.

Boston Traffic Notes.

The Boston & Albany road received from the New York Central 13,653 freight cars at Albany in December last, compared with 15,476 cars in December, 1884.

Michigan General Passenger Agents' Association.

At the meeting of the Michigan General Passenger Agents' Association in Grand Rapids, Jan. 21, the old agreement was adopted for the ensuing year without change, and the same rules in relation to passes, special rates, etc., will be enforced this year as last.

Passenger Rates.

At a meeting held in New York last week it is understood that the trunk line representatives decided to make no effort to meet the cut in rates made by the Baltimore & Ohio, but to ignore that cut as far as possible, and to steadily maintain the west-bound passenger rates.

Cotton.

Cotton movement for the week ending Jan. 22 is reported as follows, in bales:

	1885.	1884.	Inc. or Dec.	P. c.
Interior markets	48,321	40,377	I.	1,944 4.2
Receipts	69,061	53,153	I.	15,908 29.8
Shipments	403,250	298,080	I.	105,170 35.3

Exports 110,310 93,911 I. 16,399 17.5
Stock, Jan. 22 1,087,503 898,724 I. 188,779 21.0

The total movement from plantations for the crop year to Jan. 22 is estimated at 5,111,934 bales, against 4,805,610 last year, 4,649,366 in 1883-84 and 5,025,977 bales in 1882-83.

Chicago-Ohio River Pool.

At a meeting of this association in Chicago last week, it was agreed that the newly organized sixth pool, which includes all the business between Chicago and Green Line points south of Kentucky and Virginia and east of the Mobile & Ohio road, should be so divided that 54 per cent. of the business should be given to the old members and 46 per cent. to the new members. The division between the old members was promptly agreed upon, but after much discussion the new lines failed to decide their percentages, and a final settlement was postponed.

Southwestern Railway Association.

A meeting of the general managers of lines in the Southwestern Railway Association was held in Chicago, Jan. 22, the time being given up to hearing arguments from representatives of merchants of St. Louis and Kansas City in relation to the alleged discrimination against those cities in favor of Chicago. Several elaborate arguments were made, and the representatives of the lines present agreed to give the matter immediate consideration.

Middle and Western States Freight Association.

A meeting of this Association was held in Cleveland, O., Jan. 20. The first point under discussion was the proposition to issue 1,000-mile tickets to shippers at the rate of 2 cents per mile. After a long discussion no conclusion was reached, the Michigan roads standing out for 1½ cents per mile, and it was resolved to refer the whole matter to the Central Traffic Association. The committee appointed to adopt a uniform bill of lading was not ready to present a final report, so that no action was taken on that point.

The Railway Car Association.

The following is dated Buffalo, N. Y., Jan. 18: "Commencing from date, please send all junction reports and all other information relative to the movements of Swift Refrigerator line cars, numbered from 1 to 999, inclusive, to C. W. Cushman, Manager the Railway Car Association at Buffalo.

"The mileage of these cars should be reported to and settled with G. F. Swift, President Swift Refrigerator Transportation Co., No. 72 Exchange Building, Union Stock Yards, Chicago."

RAILROAD LAW.

Fire—Remote Damages.

In the case of Seale against the Gulf, Colorado & Santa Fe Co., the petition alleged that the defendant company, through negligence, allowed sparks of fire to escape from its passing engine, which set fire to grass and weeds which they had allowed to accumulate on the right of way, and that it spread on to the land of the plaintiff and was about to be communicated to her fence; to prevent this her daughter was engaged in fighting the fire, and in so doing her clothing took fire and caused her death, and this without negligence on her part. This suit is by her mother for damages for her death.

The Texas Supreme Court now holds affirming the decision of the Circuit Court that the consequences were too remote and the negligence charged against the company cannot be considered as the proximate cause of death.

OLD AND NEW ROADS.

Baltimore & Ohio.—In Trenton, N. J., Jan. 25, the Committee on Riparian Rights of the New Jersey Legislature gave a hearing on the concurrent resolution recently offered in the Legislature, requesting Congress not to authorize the construction of a bridge over the Arthur Kill, which resolution had been referred to the committee. Arguments in favor of the bridge were made by Messrs. Kearbey, Robeson, Cowan and Wyman, and against it by Mr. Courtland Parker. The Assembly, on Jan. 27, passed a resolution protesting against the building of any bridge without authority from the state.

Baltimore & Potomac.—This company's statement for December and the year ending Dec. 31 is as follows:

	December.	Year.	1885.	1884.
Earnings	\$107,845	\$100,137	\$1,223,091	\$1,224,572
Expenses	55,016	83,210	708,551	838,939
Net earnings	\$52,829	\$16,927	\$514,540	\$385,633

For the year the gross earnings increased \$98,519, or 8.0 per cent., and the expenses decreased \$70,388, or 8.4 per cent., the result being a gain of \$168,907, or 43.8 per cent., in net earnings.

Buffalo & Geneva.—This company has been organized to build a railroad from Buffalo, N. Y., eastward to Geneva, about 100 miles. An effort will be made to secure the best and most direct possible line, with easy grades, and the survey of the line will begin as soon as the weather will permit. The officers of the new company state that they do not represent and are not connected with any existing line, but the general belief is that the project is in the interest of the Lehigh Valley, as the new road will connect with that company's Geneva, Ithaca & Sayre road at Geneva.

Chesapeake & Ohio.—This company has had a survey made for a branch line from Gordonsville, Va., to Alexandria. The line will be nearly parallel, but some distance from the Virginia Midland. Officers of the company state that it has not yet been decided whether the line shall be built or not.

Chicago, Calumet & Eastern.—This company has filed articles of incorporation to build a railroad from Chicago through Calumet to Hammond, Ind.

Chicago & Eastern Illinois.—The gross and net earnings for the first half of the fiscal year are as follows:

	1885.	1884.	Increase.	P. c.
Earnings	\$928,311	\$857,743	\$70,568	8.2
Expenses	470,275	457,654	12,621	2.8
Net earnings	\$458,036	\$400,089	\$57,947	14.5

This shows a substantial increase in net earnings. The decrease shown thus far in January in gross earnings is largely due to snow-blockades and other temporary causes.

Chicago, Milwaukee & St. Paul.—A meeting of the directors was held in New York Jan. 23, the proceedings of which were not made public, but it is stated that the board decided to begin work on the extension from Ottumwa to Kansas City. It is reported that there was considerable opposition to this plan, and that it was not unanimously reached. It is also stated that the cost of the proposed extension will be met by a further issue of bonds under the Chicago & Pacific Western Division mortgage.

Cincinnati, Indianapolis, St. Louis & Chicago.—Surveys are to be made for an extension of this company's Columbus, Hope & Greensburg branch from Columbus, Ind., to Bedford, where it will connect with the Bedford & Bloomfield road. It is also reported that negotiations are in progress for the purchase of that road, which is now owned by

the Indianapolis Rolling Mill Co., and that, if purchased, it will be changed from 3 ft. to standard gauge, and probably extended westward to a St. Louis connection.

Clearfield & Jefferson.—This company, which was organized last year to build a railroad from Irwona, Pa., the terminus of the Bell's Gap road, westward to Punxsutawney, a distance of 40 miles, has let a contract for the construction of its line from Irwona to the Susquehanna River, a distance of 16 miles. The road when completed will be leased to the Bell's Gap Railroad Co., and that company will indorse the bonds of the new road, which are to bear 6 per cent. interest and are not to exceed \$25,000 a mile. The stock and bonds of the new company are now offered to the stockholders of the Bell's Gap Co., each holder of 20 shares of that company's stock being entitled to purchase \$500 in bonds and \$500 in stock of the Clearfield & Jefferson Co., the price to be paid being \$500.

Columbia & Broad River.—This company has been organized to build a railroad from Columbia, S. C., following nearly the line of Broad River, to Prosperity, a distance of about 50 miles, through a very good country.

Columbia & Laurens.—This company has been chartered in South Carolina to build a railroad from Columbia, by way of Newberry, to Laurens.

Denver & Rio Grande Western.—The Coppel Committee having advertised the abandonment of their plan and the return of deposited securities to the owners, it is to the common interest of bondholders that all should now unite on the resumption plan, and that such have not already done so should exchange the required coupons for trustees' certificates, as provided therein. Such speedy fulfillment, by removing any further uncertainty as to the future position of the bonds, will enable all energies to be concentrated on the development and improvement of the common property, and warrant further increase of confidence in its outcome.

President Palmer issues the following notice: "The Coppel Committee having advertised the abandonment of their plan and the return of deposited securities to the owners, it is to the common interest of bondholders that all should now unite on the resumption plan, and that such have not already done so should exchange the required coupons for trustees' certificates, as provided therein. Such speedy fulfillment, by removing any further uncertainty as to the future position of the bonds, will enable all energies to be concentrated on the development and improvement of the common property, and warrant further increase of confidence in its outcome."

Des Moines & Fort Dodge.—The gross and net earnings for December and for the year ending Dec. 31, were as follows:

	December	Year
	1885	1884
Gross earnings.....	\$35,000	\$29,435
Operating expenses.....	17,197	23,147
Net earnings.....	\$17,803	\$6,288

For the year the gross earnings increased \$28,388, or 8 per cent., and the expenses \$9,631, or 3.8 per cent., leaving a gain of 18,757, or 18.4 per cent. in net earnings.

Duluth, St. Cloud & Denver.—This company has filed articles of incorporation to build a railroad from Duluth, Minn., to St. Cloud, and thence westward.

East Tennessee, Virginia & Georgia.—Mr. Nelson Robinson, who held proxies of the controlling interest in East Tennessee stock at the recent election, having returned from Europe, held a conference last week with Mr. Robert Fleming, of Dundee, Scotland, and other bondholders of the road. After an interchange of views, it was resolved to draft a new plan for the reorganization of the property. This will be submitted in a few days, and an outline of the plan which will be offered has been reported as follows: The consol bonds and interest up to Nov. 1, 1886, (112 per cent.) will receive 83 in new 5 per cent. consols and the other 29 per cent. in new 5 per cent. first-preferred stock. The income bonds are to receive second-preferred 4 per cent. stock and be assessed 4 per cent., for which assessment they will get first-preferred stock. The present preferred and common stocks are to get the new common stock of the company by paying \$6 per share on new stock; and for this assessment they shall get second-preferred stock. The preferred gets share for share of the present holdings, and common gets 40 per cent. of present holdings. The whole issue of new common stock is to be \$27,500,000.

Eastern.—A lively controversy continues between the directors elected at the recent meeting and the trustees. The directors have issued a lengthy circular, setting forth the reason for their election, and taking exception to what they characterize as the arbitrary action of the trustees, and calling attention to the remarkable character of the statements contained in the trustees' circular of last week. Another letter has also been issued, excepting to the refusal of Mr. Phillips to entertain motions made at the bondholders' meeting, and its attempt to prevent the bondholders from taking any action at that meeting. An equally sharp and lengthy reply from the trustees is now in order.

The suit brought to test the validity of the election of the directors at the recent annual meeting came up in the Supreme Court in Boston Jan 25 for hearing. The petitioners in the case seek to have the election set aside on various grounds. It is claimed that certain certificates belonging to the sinking fund were voted on by the trustee, when they have been cancelled, and also that the proxies of the certificates held by the corporation of Harvard College were not properly executed, and that votes cast upon these properties should have been rejected.

Houston & Texas Central.—The present receivership of this road was ordered on the suit of the Southern Development Co., for money advanced to the company to pay interest and for other purposes. An attempt was made to arrange matters with the bondholders, but with very little success, they being apparently disposed to take matters into their own hands. In consequence of this determination the trustees under the different mortgages have received the necessary instructions on Jan. 21. Messrs. Easton and Rintoul, trustees under the first mortgages on the main line and the Western Division, filed bills of foreclosure in the United States Circuit Court at Galveston. The bill alleges default in interest and sinking fund payments and also the total insolvency of the company, and asks for the usual decree of foreclosure and sale. At the same time the Farmers' Loan & Trust Co., of New York, trustee, filed a similar bill for the foreclosure of the first mortgage of the Waco & Northwestern Division. All the trustees made themselves parties to the suit of the Southern Development Co. and are contesting the prior lien which it claims. It is understood that the trustees will prosecute these foreclosures actively, with the intention of securing the foreclosure of the road.

Indianapolis, Decatur & Springfield.—The New York Times of Jan. 24 says: "This company recently sought to discontinue the suit which it had brought against the Central Trust Co. of New York for having negligently managed an exchange of bonds of the railroad company and without authority delivered 181 of the bonds to Alphonso Duprat, the railroad company's former Secretary, which Duprat was accused of having appropriated. The trust company opposed any discontinuance unless the testimony of Mr. Duprat, who is a confirmed invalid and has been incapacitated for a long time from active business, was taken. In this Judge Brown, of the United States District Court, concurred, and, under an order made by him, the testimony of Mr. Duprat was taken. It appeared from that testimony and from

the receipts, checks, and other vouchers produced that the bonds were delivered by the trust company to the railroad company with full authority, and that so far from Mr. Duprat having appropriated the bonds, their proceeds were used to assist the railroad company in paying some of its debts when it was in great straits for money. The trust company has authorized its counsel to institute a suit against the Receiver of the road for libel and malicious prosecution, for having instituted the abandoned suit and sworn to the statements in its complaint."

Jamesville & Washington.—The Philadelphia parties who have bought this road announce their intention of at once putting the line in good condition and putting on regular trains. They purpose also extending the road from the northern terminus at Jamesville on the Roanoke, to Suffolk, Va., taking in for that purpose the narrow-gauge road now in operation from Buckland in Gates County to Suffolk, and will run trains over the Norfolk & Western from Suffolk to Norfolk. They also propose extending the road from Washington westward to Goldsboro, and thence southward to Wilmington, although this southern extension has apparently not been fully decided on, and may be changed for a line from Washington to Newberne and thence southwest to Wilmington, the intention of the company being to build a line from Norfolk to Wilmington by the most available route.

Kanawha & Ohio.—This company has filed articles of incorporation in Ohio, covering a line from Corning to Point Pleasant, on the Ohio River. The company is organized by the parties who bought the River Division of the Ohio Central at the foreclosure, and who have already organized in West Virginia.

Kansas City, Des Moines & St. Paul.—This company has been organized to purchase the Des Moines, Osceola & Southern road and extend it to Kansas City, according to the original plan.

Lackawanna & Pittsburgh.—The Court has refused to grant an order directing the Receiver to pay certain balances due the Pittsburgh & Western Co. on freight line contracts, on the ground that there are no funds to make the payments.

Lake Erie & Western.—It is said that the chief points in the plan of reorganization, which the company will shortly submit, are the issue of consolidated 6s at par for the La Fayette, Bloomington & Muncie 1s; consolidated 5s at par for Lake Erie & Western 1s, and at 80 for Sandusky Division 1s. The income bonds are to be exchanged for preferred stock at 150 for La Fayette, Bloomington & Muncie incomes, 75 for Lake Erie & Western, and 70 for Sandusky Division 1s. The common stock is to be called on to pay an assessment of \$6 per share. Some modifications in this plan are possible.

Little Rock & Fort Smith.—It is reported that this company has closed negotiations for a sale of the remainder of its land grant for \$750,000. This money will be applied to the reduction of the bonded debt.

The company has a plan for the extension of its road from Fort Smith, through the Indian Territory to Arkansas City, Kan., a distance of about 250 miles. This road cannot, of course, be built without authority from Congress, as it will pass through the Indian Territory, and the company will probably make application for the necessary legislation shortly.

Little Rock & Hot Springs.—This company has filed articles of incorporation to build a railroad from Little Rock, Ark., to Hot Springs. Besides furnishing a direct line between these two points the road will pass through the lead deposits about 10 miles from Hot Springs. The principal stockholder is Joseph Reynolds, who is the proprietor of the Hot Springs road, running from Hot Springs to Malvern, on the Iron Mountain road.

Louisville, Evansville & St. Louis.—It is announced that a majority of the first-mortgage bonds have been deposited with the trustee in favor of the proposed plan of reorganization, thus probably insuring its success.

Macon & Dublin.—This company, which has done some work on a projected line from Dublin, Ga., to Macon, is negotiating for a sale of the road to the Savannah, Dublin & Western Co., lately organized.

Maryland Central.—In the Circuit Court of Baltimore County, Jan. 19, Mr. J. C. Wrenshall, who was appointed Receiver Oct. 24, 1884, filed his report and asked the court to relieve him from the receivership. The court after full examination approved the report and reluctantly consented to grant Mr. Wrenshall's petition and relieved him from the charge of the road. The court then appointed William Gilmer and Samuel Spencer Receivers on behalf of Robert Garrett and son and other bondholders. Mr. Spencer is an officer of the Baltimore & Ohio.

Mr. Wrenshall's report shows the condition of the road and rolling stock at the time he took charge and their improved condition. It states that he has paid from the revenue of the road over \$25,000 debts contracted before his appointment, and \$6,000 for extraordinary repairs, made necessary by the flood of August last, besides a large amount for improvement of the property.

Missouri Pacific.—A St. Louis dispatch says that a contract for grading the branch of this company's Iron Mountain line from Bald Knob, Ark., to Memphis, has been let to L. I. Bush and Erskin Smith, who are to begin work immediately.

Nashville, Chattanooga & St. Louis.—The statement for December and the six months of the fiscal year from July 1 to Dec. 31 is as follows:

	December	Six months
	1885	1884
Earnings.....	\$193,327	\$197,512
Expenses.....	118,515	112,753
Net Earnings.....	\$74,812	\$84,759
Interest and taxes.....	338,015	342,931
Surplus.....	\$110,043	\$181,708

For the six months this shows a decrease in gross earnings of \$103,192, or 8.7 per cent.; in net earnings of \$76,581, or 14.6 per cent., and in surplus of \$71,665, or 39.4 per cent.

New Jersey & New York.—A meeting of the stockholders was held at the office in Jersey City, Jan. 27, to discuss the question of consolidating with the Hackensack Railroad, which forms a part of the main line of the road and has heretofore been leased by the company. There was considerable discussion, and charges were made that the stockholders had been kept in the dark as to the management of the road and all information had been refused them. It was also charged that nearly all the stock of the Hackensack Railroad was held by one of the directors. The consolidation was, however, approved by a two-thirds vote, the minority protesting.

New York Central & Hudson River.—The report that this company will build a new branch from Schenectady, N. Y., to Saratoga, has made its appearance, as usual. It comes around every year about this time, but no assurances can be obtained as to its truth or falsity.

New York, Chicago & St. Louis.—In Cleveland, Jan. 23, answers were filed by the company and the Union Trust Co., trustee, to the cross-petition filed in behalf of the Equipment Co., by its trustees. The cross-petition claimed the rolling stock now on the road as the property of the trustee. In the answer the company claims that about \$2,000,000 had been paid on the purchase price of the equipment before the cross-petition was filed and that the terms of the contract have not been kept. The Court is asked to require of the trustees a full account of its expenditures and also an account of certain trust funds deposited in the Metropolitan National Bank in New York, which, it is claimed, were invested in worthless securities and lost.

The Committee of car trust certificate holders publishes a notice that of the \$4,000,000 total issue of these car trust certificates, there are only \$252,000 not controlled by them. The rolling stock securing all these certificates is advertised to be sold Feb. 15 next, and the committee give notice that they will represent only the car trust certificates that may be deposited in the First National Bank, New York, subject to their order up to and including Feb. 10, 1886.

New York & New England.—It is now reported that negotiations are nearly completed for a traffic arrangement between this company and the New York, New Haven & Hartford which will involve very close relations between the two companies and will be almost equivalent to a lease, while it will be free from the objection which might be raised in case of a lease.

At a meeting of the board held in Boston, Jan. 26, the subject of a lease or agreement with the New York, New Haven & Hartford Co. was discussed, and a committee consisting of Messrs. Haven, Hignison and Kingsbury was appointed to confer with the New Haven Co.

At this meeting a protest or notice was served on the board to the effect that suit will be brought to recover possession of the road and protesting against any lease or other disposition of the property on that account. The suit referred to is understood to be the old Boston, Hartford & Erie suit to set aside the foreclosure under which the road passed into possession of the present company.

New York, New Haven & Hartford.—President Watrous says that this company has made no proposition for a lease of the New York & New England road and has taken no action in that direction. The board will give fair consideration to any proposal which may be submitted by the New England Co., but what its action may be is uncertain.

Northern Central.—The statement for December and the year ending Dec. 31 is as follows:

	December	Year
	1885	1884
Earnings.....	\$307,699	\$442,269
Expenses.....	286,445	353,049
Net earnings.....	\$21,254	\$89,220

For the year the gross earnings decreased \$30,955, or 0.6 per cent., and the expenses \$212,779, or 6.1 per cent., leaving a gain of \$181,824, or 8.9 per cent., in net earnings.

Northern Pacific.—The contract for building the tunnel at the summit on the Cascade Division has been let to Mr. Nelson Bennett, of Montana. The contract price is said to be \$800,000. The tunnel will be nearly two miles long, and it is expected that it will take nearly two years to complete it.

Ohio Valley.—Grading on this road has been completed from Henderson, Ky., to Morganfield, about 15 miles, and work has been begun on the line from Morganfield to De-koven. Track-laying has been begun at Henderson and the rails are reported down for 3 miles.

Oregon Improvement Co.—Gross and net earnings in November and for the fiscal year ending Nov. 30, were as follows:

	November	Year
	1885	1884
Earnings.....	\$235,307	\$305,057
Operating expenses.....	184,539	200,460
Net earnings.....	\$50,768	\$104,597

The Boston Herald reports: "The Oregon Improvement Co.'s second mortgage was executed yesterday, and the bonds are printed. They will run 10 years and bear 8 per cent. semi-annual interest, being subject to call at par on any coupon day. The amount will be \$700,000 or \$800,000, and they will be offered to stockholders within a few days. These issued, the fixed charges of the road, including sinking fund, will be a little rising of \$400,000 per year. The net earnings for the year ended Nov. 30, 1885, were some \$610,000, and the last fiscal year was a bad one. The company has some \$100,000 cash on hand, and could begin paying dividends this year but for the policy to first retire the bonds soon to be issued. The floating debt is all owed to the Oregon & Transcontinental Co., except about \$70,000. The second-mortgage bonds will pay this entire indebtedness."

Oregon Railway & Navigation Co.—This company's statement for the first half of its fiscal year (beginning July 1) is as follows:

	Gross	Expenses	Net
July.....	\$405,876	\$210,612	\$195,264
August.....	443,458	225,898	217,560
September.....	577,559	266,971	310,588
October.....	666,212	291,692	374,520
November.....	629,672	286,902	342,770
December.....	487,900	283,000	204,900
Total.....	\$3,260,679	\$1,569,525	\$1,691,154

The company's railroad lines are just now suffering from a snow blockade, which is not so bad, however, as that of a year ago, and does not seem likely to last as long.

Pennsylvania.—This company's statement for December, as compared with December, 1884, shows for all the lines east of Pittsburgh and Erie an increase in gross earnings of \$277,354, an increase in expenses of \$14,383, and an increase in net earnings of \$262,971. The year 1885, as compared with 1884, shows for the same lines a decrease in gross earnings of \$2,951,884, a decrease in expenses of \$1,047,251, and a decrease in net earnings of \$1,904,633.

Carrying out these changes we have the following statement:

	December	Year
	1885	1884
Earnings.....	\$4,046,681	\$3,769,327
Expenses.....	2,087,481	2,073,098
Net earnings.....	\$1,959,200	\$1,696,229
Pr. cent. of exps.....	66.4	70.9

All lines west of Pittsburgh and Erie for the year 1885 show a deficiency in meeting the liabilities of \$1,082,064, being an increased deficiency as compared with 1884 of \$220,172.

Philadelphia & Reading.—In the United States Circuit Court, in Philadelphia, Jan. 26, the petition of Mr. Alfred Sully, representing \$600,000 of the mortgage bonds, to be admitted as intervening plaintiff in the Robinson suit, was granted. Mr. Sully has already been admitted as intervener in the Kelsey suit.

The statement of business of the Philadelphia & Reading Railroad and Coal & Iron companies for the month of December, 1885, as compared with the same month in 1884,

shows an increase in gross earnings of \$547,403; an increase in expenses of \$308,027; increase in net earnings, \$239,376. President Gowen's plan for the reorganization of the company is apparently his old one of an issue of \$100,000,000 new bonds at a low rate of interest, which are to be used to retire or pay off all the present debt, both funded and floating, of both the Reading companies. It is said, however, that he will add to this the organization of a trust company, which is to take the new bonds and advance the money as needed. All holders of Reading stock and bonds are to be asked to subscribe to the stock of this trust company, and thus supply the means of paying their debts.

Portland & Willamette Valley.—Work has been begun on this road, which will extend from Portland, Ore., southward to Townsend, the present northern terminus of the Oregonian road. It is intended to give that narrow-gauge line a connection of its own with Portland. The rails have been ordered, and the intention is to complete the road by July. The terminus will be in South Portland, where the company has secured property with a good water front.

Rochester & St. Paul.—This company has been organized to build a direct connection between Rochester, Minn., and St. Paul. It has not yet been decided whether a new line will be built for the entire distance or whether a road will be built from Rochester to a connection with the Minnesota & Northwestern near West Concord, which is the line favored by a number of the incorporators.

Rome, Watertown & Ogdensburg.—This company has recently purchased 6 new passenger and 2 baggage cars, all equipped with the Westinghouse automatic brake. The company has also ordered 150 box and 50 coal cars of 20 tons capacity, these additions to the equipment being made necessary by increasing traffic.

St. Catharines & Niagara Central.—At the annual meeting, Jan. 25, the directors reported a considerable amount of grading and other work done on the line between Thorold, Ont., and Niagara Falls.

St. Joseph & Grand Island.—The following statement is made for November and the seven months from May 1 to Nov. 30.

	November.	Seven months.
Earnings	1885. 1884. 1885. 1884.	
Expenses	1885. 1884. 1885. 1884.	
Net earnings	1885. 1884. 1885. 1884.	

For the seven months the gross earnings decreased \$45,506, or 6.5 per cent., and the expenses \$99,414, or 19.1 per cent., leaving a gain of \$53,908, or 30.1 per cent., in net earnings.

St. Paul, Fort Snelling & Minneapolis.—This company has filed articles of incorporation in Minnesota to build a railroad from a point in St. Paul to Minneapolis, with a branch to Fort Snelling. It is intended to operate the road by steam, using light engines and cars, and running very frequent trains between the two cities at low fares.

Salem & Poplar Bluff.—It is proposed to build a railroad from Salem, Mo., which is the centre of a large iron industry and a terminus of a branch of the St. Louis & San Francisco road, southeast about 100 miles to Poplar Bluff, on the St. Louis, Iron Mountain & Southern road. The road will pass through a country now without railroads and which contains a great deal of valuable timber.

Saratoga & Almaden.—Work is progressing steadily on this California road, with some delay caused by severe weather. The track is reported laid to Saratoga, Cal., 10 miles eastward from the starting point at Murphy, on the Northern Division of the Southern Pacific road, and grading is in progress from Saratoga to New Almaden.

Savannah, Florida & Western.—It is stated that this company has agreed to build a branch from Quitman, Ga., to Monticello, Fla., provided a reasonable amount of aid is given along the line. Committees have been appointed to secure the required amount, which, it is believed, can be secured without difficulty.

Soldier Run.—This company has been organized to build a railroad from Reynoldsville, Pa., on the Low Grade Division of the Allegheny Valley road, to Rathmel, a distance of 4 miles. It is intended to reach some new coal mines, and the coal firm of Bell, Lewis & Yates, of Buffalo, are the principal incorporators.

South Bend & Benton Harbor.—This company has been organized to build a railroad from South Bend, Ind., to the Michigan line, near Buchanan, a distance of 14 miles.

South Pennsylvania.—In accordance with its decision as heretofore announced, the Circuit Court at Harrisburg has entered a decree continuing the injunction against a sale of this road to the Pennsylvania or the Bedford & Bridgeport Co. Exceptions to the decree were filed.

Texas & Pacific.—The Receivers announce their intention of improving the present condition of the road as fast as the money at their command will permit. Contracts have already been placed for 1,000 tons of steel rails and 350,000 new ties, and they hope to be able to continue the laying of steel rails at the rate of about 1,000 tons per month.

Tonawanda Valley & Cuba.—In the New York Supreme Court, in Buffalo, Jan. 25, a motion was made on behalf of the Metropolitan Trust Co., trustee, for the removal of the Receiver, on the ground that he does not operate the road. On behalf of the Receiver it was shown that he suspended operations because he had no money and was unable to continue payment of wages and other expenses. After hearing this answer the court denied the motion and continued the Receiver in charge.

Wabash, St. Louis & Pacific.—The Receivers have closed the large shops at Springfield, Ill., for an indefinite time, the object being to reduce expenses. Over 300 men were employed in these shops.

West Shore.—As recently stated, the work heretofore done in the Buffalo shops of this road has been transferred to the New York Central shops in that city. It is understood that the Buffalo shops, which are well equipped, will be used as repair shops for the New York Central Sleeping Car Co., and the work of that company will shortly be taken there.

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the Railroad Gazette:

	Page.		Page.
Baltimore & Philadelphia	15	Naugatuck	26
Boston & Lowell	15	N. Y. & New England	16
Boston & Maine	15	N. Y. N. Haven & Hartford	13
Boston & Providence	15	N. Y. Providence & Boston	16
Buffalo, N. Y. & Philadelphia	16	N. Y. Railroad Commission	33
Fitchburg	16	N. Y. West Shore & Buffalo	38
Lake Shore & Mich. So.	16	Northeastern (South Carolina)	16
Lehigh Valley	16	Philadelphia & Reading	48
Maine Central	16	Pittsburgh & Lake Erie	48
Michigan Central	13	Pitts., MoK. & Youghiogheny	48

Richmond & Danville.

This company owns the Richmond & Danville (including the Piedmont road) from Richmond, Va., to Greensboro, N. C., 189 miles, with 12.2 miles of branches, and the Northwestern North Carolina road, 25.2 miles. It leases the Richmond, York River & Chesapeake, Richmond to West Point, 38 miles; the North Carolina road, Goldsboro, N. C., to Charlotte, 223.1; the Atlanta & Charlotte Air Line, Charlotte, N. C., to Atlanta, Ga., 269; making 756.5 miles worked in all. The report is for the year ending Sept. 30.

The company controls and works the Milton & Sutherland, 6.8, and the State University road, 9.2 miles, which are reported separately. Through the Atlanta & Charlotte lease, it controls 70 miles of narrow-gauge branches in Georgia. Through the Richmond & West Point Terminal Co., it controls the Charlotte, Columbia & Augusta, the Columbia & Greenville, the Georgia Pacific, the Western North Carolina and the Virginia Midland roads, 1,580 miles of road in all.

The general account is as follows, condensed:

Stock	\$5,000,000
Funded debt	9,384,500
Bills and accounts payable	767,443
Interest and rentals	671,039
Sundry balances due	92,458
Profit and loss	1,360,308
Total	\$17,265,748
Road and equipment	\$9,386,283
Betterments, leased lines	992,917
Stocks, bonds, advances, etc.	6,178,369
Supplies on hand	335,578
Accounts and balances receivable	217,905
Cash	154,696
Total	\$17,265,748

The funded debt consists of \$3,000 old second; \$627,500 consols of 1867; \$4,785,000 general mortgage bonds and \$3,969,000 debentures. During the year there was a decrease of \$603,600 consols and an increase of \$767,000 general mortgage bonds; a net increase of \$163,400 in funded debt.

The passengers and freight carried were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passengers carried	559,386	667,360	D.	7.974
Tons freight carried	1,451,646	1,327,037	I.	124,609

The increase in tonnage is notable, as last year was not generally favorable to the freight traffic of southern lines.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Freight	\$2,680,755	\$2,520,562	I.	\$140,193
Passengers	985,709	960,325	I.	25,384
Mail and express	238,471	239,945	D.	1,024
Rents, etc.	96,420	94,838	I.	1,582
Total	\$3,981,355	\$3,815,220	I.	\$166,135
Expenses	2,231,486	2,218,977	I.	12,509
Net earnings	\$1,749,869	\$1,596,243	I.	\$153,626
Gross earn. per mile	5.263	5.043	I.	.220
Net	2.313	2.110	I.	.203
Per cent. of exps.	56.1	58.2	D.	2.1

Expenses include taxes and all renewals of road and equipment.

The expenses were divided as follows:

	1884-85.	P. c.	1883-84.	P. c.
Conducting transportation	\$694,487	17.4	\$653,352	17.1
Motive power	616,553	15.5	621,105	16.3
Maintenance of cars	214,632	5.4	198,456	5.2
Maintenance of way	446,128	12.2	537,355	14.1
General expenses	219,686	5.6	208,769	5.5
Total	\$2,231,486	56.1	\$2,218,977	58.2

The only considerable change was in maintenance of way, which shows a decrease of \$51,227, or 9.4 per cent. The other changes are not large.

The result of the year was as follows:

Net earnings, as above	\$1,749,869
Interest on investments	17,793
Total	\$1,767,662

Interest on bonds	\$592,386
"floating debt	48,361
Rental of leased lines	872,350
Total	1,483,097
Net balance	\$284,565
New construction and equipment	\$114,812
Betterments At. & Char. Air Line	106,236
Total	221,048
Balance over all expenditures	\$63,517

The rental paid for the Richmond, York River and Chesapeake is \$85,850; the Piedmont road, \$60,000; the North Carolina road, \$260,000, and the Atlanta & Charlotte Air Line, \$460,500.

The report says: "The roadway and track have received the necessary repairs and attention. New steel rails to the amount of 6,000 tons have been put in on the several divisions. There have been 11,000 ft. of sidings added and a full complement of ties, say 190,000, have been used during the year in the improvement of track."

Improvements include two new iron bridges, the filling of several trestles and one new station. Four heavy locomotives were bought; 2 passenger, 1 postal and 88 freight cars were built in the shops.

The report says: "The general traffic of the company has been well maintained during the year, as shown by the results above stated; and with the gradual disappearance of business depression now visibly going on, its continued improvement may reasonably be expected."

"In May last \$610,800 of the company's consol bonds issued under the mortgage of 1867 became due and were satisfied and canceled, leaving \$2,900 that have not been presented for payment."

"No payment of interest on the debenture bonds has been declared or made during the past year. The entire surplus of earnings over fixed charges and construction account has been applied to payment of obligations issued for betterments and improvements of prior years, and which have been carried since their issue, the surplus earnings of those years having been insufficient for their payment at the time."

"The directors have deemed it for the best interests of all classes of security holders to continue a policy of improvement of the company's railroad and property, to meet the conditions of increasing traffic; and this policy is made necessary by the improved facilities of competing lines."

Connecticut River.

This company owns a line from Springfield, Mass., to South Vernon, 50 miles, with branches to Chicopee, 2.35 miles, and to Easthampton, 3.50 miles. It leases the Ashuelot road, from South Vernon to Keene, N. H., 24 miles, making a total of 55.85 miles owned and 79.85 worked. The report is for the year ending Sept. 30.

The company controls the Vermont Valley road, from Brattleboro, Vt., to Bellows Falls, 24 miles, and the Sullivan County road, from Bellows Falls to Windsor, 26 miles, but their operations are not included in the report.

The general account is as follows, condensed:

Capital stock	\$2,370,000
Unfunded debt	850,766
Profit and loss, surplus	976,829
Total	\$4,197,595
Road and equipment	\$3,376,988
Other permanent investments	99,610
Materials and supplies	65,771
Notes and accounts receivable	562,150
Cash	63,079
Total	\$4,197,595

The unfunded debt is made up of \$625,000 notes payable, \$224,633 accounts and balances payable, and \$1,136 dividends unclaimed. The company has no funded debt.

The earnings from traffic for the year were:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passengers	\$355,922	\$371,796	D.	\$15,874
Freight	446,761	461,552	D.	14,791
Mail and express	27,611	27,465	I.	146
Total	\$830,294	\$860,813	D.	\$30,519
Expenses	596,906	631,214	D.	34,308
Net earnings	\$233,388	\$229,599	I.	\$3,789
Gross earn. per mile	10.398	10.780	D.	3.7
Net	2.923	2.875	I.	48
Per cent. of exps.	71.9	73.3	D.	1.4

Expenses include taxes and also all improvements of road, nothing having been added to property account.

The expenses for the year were divided as follows:

	Amount.	Of exps.	Of earn.
Maintenance of way	\$181,345	30.38	21.84
Repairs of equipment	68,202	11.42	8.22
Transportation	244,795	41.02	29.48
Miscellaneous	44,489	7.45	5.36
Taxes	58,075	9.73	7.00
Total	\$596,906	100.00	71.90

Miscellaneous expenses include the general office expenses, legal expenses, insurance, and similar items.

The result of the year was as follows:

Net traffic earnings, as above	\$233,388
Rents, interest, etc.	38,634
Total	\$272,022

Rentals paid	\$22,174
Interest	29,654
Dividends, 8 per cent.	189,600
Total	241,428

Balance, surplus for the year

Surplus from previous year	\$30,794
Less sundry deductions	282
Total surplus, Sept. 30, 1885	\$30,512

The total receipts of the company, including rents and miscellaneous, were \$869,128; a decrease from the previous year of \$31,880, or 3.5 per cent.

The traffic for the year was as follows:

	1884-85.	1883-84.	Decrease.	P. c.
Train-miles	594,949	607,063	12,114	2.0
Passengers carried	1,415,701	1,477,949	62,248	4.2
Passenger-miles	15,165,876	15,629,660	463,784	2.9
Tons freight carried	606,345	636,120	29,775	4.8
Ton-miles	15,093,085	15,115,967	22,882	0.1

Average rate:
Per passenger-mile 2.34 cts. 2.37 cts. 0.03 ct. 1.3
Per ton-mile 2.96 " 3.05 " 0.09 " 2.9

The average passenger journey last year was 10.71 miles; the average freight haul, 24.90 miles. The earnings per revenue train-mile were 169.1 cents; the expenses, 121.5; the net earnings, 47.6 cents.

During the year 412 tons of heavy steel rails and 52,515 new ties were laid, and the road and equipment generally were kept in good condition. The new passenger station at Holyoke was completed. The total cost, including that of bridges and other works necessary to do away with the grade crossings there, has been \$127,533.

The decrease from the income has been from the passenger department and in through freight, while in local freight there has been a substantial increase. The reduction in expenses was made notwithstanding the payment of \$58,660 for various items of improvements, which might have been charged to the property account.

Pittsburgh Junction.

This company owns a line across Pittsburgh, Pa., 4½ miles long, with a branch 1 mile long, 5½ miles in all. The road connects the Baltimore & Ohio with the Pittsburgh & Western and also with a number of factories and furnaces.

The report presented at the annual meeting this week for the year ending Dec. 31 last says: "Owing to the fact that there is not sufficient time to get proper and full statement of the earnings and expenses for the year ending Dec. 31, and the time fixed by law for the annual meeting, your board is compelled to approximate the same as follows:

Earnings (\$18,182 per mile)	\$100,000
Expenses (15.3 per cent.)	15,265
Net earnings (\$15,383 per mile)	\$84,735

"The business during the past year is in the main satisfactory. Owing to the development and use of natural gas as a fuel, the depression in consequence of loss of local business in the coal trade, and the universal depression in all industries, the revenue of the Pittsburgh Junction has, like all railroad properties, suffered thereby."

"With the improvement of business which is looked for in the coming year, and the development of new markets for Pittsburgh gas coal, it is expected that the business for the ensuing year will show a marked and decided improvement on that of the past."

Rome, Watertown & Ogdensburg.

This company owns a main line from Norwood, N. Y., to Suspension Bridge, 286 miles, with 132 miles of branches, making 418 miles in all. The following figures are from advance sheets of the report of the Railroad Commission for the year ending Sept. 30.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Earnings	\$1,792,732	\$1,691,753	I.	\$100,979
Expenses	1,095,053	1,058,931	I.	36,122
Net earnings	\$697,679	\$632,822	D.	\$64,857
Gross earn. per mile	4.074	4.047	I.	27
Net	1.454	1.514	D.	60
Per cent. of exps.	64.3	62.6	I.	1.7

The increase in expenses was somewhat greater than that in gross earnings, leaving a small decrease in net earnings. Expenses do not include taxes.

The result of the year was as follows:

Net earnings, as above	\$697,679
Income from other sources	40,639
Total	\$748,318

Interest, taxes, rentals, etc.	632,971
Surplus for the year	\$115,347

In 1883-84 there was a surplus of \$27,950, and in 1882-83 a deficit of \$137,180 for the year.

New York, Ontario & Western.

This company owns a line from Middletown, N. Y., to Oswego, 248.5 miles, with 47 miles of branches. It leases the West Shore line from Middletown to Weehawken, 77.1 miles, making 325.6 miles worked. The report is for the year ending Sept. 30.

Since the close of the year the company has acquired the line from Weehawken to Cornwall, 25 miles, as noted below.

The equipment includes 73 locomotives; 47 passenger, 14 combination and 19 baggage, mail and express cars; 21 milk, 477 box, 62 stock, 650 flat, 637 coal and 22 caboose cars; 3 derrick and 3 tool cars.

The general account, condensed, is as follows:

Common stock	\$58,113,983
Preferred stock	2,000,000
First mortgage 6 per cent. bonds	134,000
Bills, accounts and balances payable	1,443,441
Income account, balance	498,607
Total	\$62,190,031
Road and property	\$53,434,226
Cost of line Weehawken to Middletown	6,727,495
West Shore & Ontario Terminal Co.	677,210
Materials on hand	221,433
Discount, taxes, etc.	33,133
Accounts and balances	1,057,464
Cash	39,070
Total	\$62,190,031

Since the close of the year a settlement has been made with the North River Construction Co. which reduces the floating debt below \$1,000,000.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Earnings	\$1,979,637	\$1,919,138	I.	\$60,499 3.1
Expenses	1,652,760	1,754,634	D.	101,874 5.8
Net earnings	\$326,877	\$164,504	I.	\$162,373 98.7
Gross earn. per mile	5.313	5.151	I.	.162 3.1
Net " "	.442	.435	I.	.007 1.6
Per cent. of exps.	83.5	91.4	D.	7.9

The earnings last year were made up as follows: Freight, \$1,125,063; passengers, \$672,752; mail and express, \$77,243; miscellaneous, \$25,217; interest, \$79,362; total, \$1,979,637. Expenses include taxes, which amounted to \$88,800 last year.

The expenses per train-mile were, in cents:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Operating transportation	34.72	40.0	37.42	43.2
Motive power	20.15	26.7	22.66	26.2
Maintenance of cars	5.02	6.6	4.31	5.0
Maintenance of way	11.12	14.7	14.95	17.3
General expenses	4.50	6.0	5.33	6.1
Telegraph	1.89	2.2	1.89	2.2
Total	75.51	100.0	86.56	100.0

Train mileage here includes all trains, working and switching as well as revenue trains.

The result of the year was as follows:

Net earnings, as above	\$326,877
Interest on bonds	\$4,840
Rentals, leased line and terminals	292,101
Surplus for the year	\$29,936

Expenditures for new construction and equipment last year were \$139,774, against \$704,613 in the previous year. Renewals (included in expenses) were 2,000 tons of steel rails and 115,461 new ties. Since the close of the year 17.6 miles have been relaid with steel, leaving 115 miles of track still laid with iron. The work of rebuilding bridges and filling trestles has been continued.

The traffic for the year was as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Train miles:				
Passenger	616,215	591,273	I.	24,942 4.2
Freight	495,528	524,402	D.	28,874 5.5
Mixed	268,764	257,951	I.	10,813 4.2
Work, etc.	18,192	234,224	D.	216,032 92.3
West Shore trains	387,082	303,940	I.	83,142 27.5
Total	1,786,381	1,911,790	D.	125,409 6.6
Passengers carried	1,049,581	944,093	I.	145,488 15.4
Passenger-miles	39,730,135	32,485,364	I.	7,244,771 22.3
Tons freight carried	1,470,808	1,064,248	I.	406,560 46.4
Ton-miles	93,583,089	69,964,956	I.	23,618,133 35.7

Average rate:
Per passenger-mile 1.69 cts. 1.96 cts. D. 0.27 ct. 13.8
Per ton-mile 1.20 " 1.55 " D. 0.35 " 29.6

Leading items of freight were 444,049 tons coal, 200,493 tons grain and 124,805 tons lumber. The milk carried was 35,918 tons, an increase of 28.3 per cent.

The report gives a long statement of the difficulties brought upon the company by the failure and reorganization of the West Shore road, and gives the following account of the settlement just effected: "Under the original lease of the road from Weehawken to Middletown, which was prior to the West Shore mortgage, the Ontario Co. agreed to pay as a rent 25 per cent. of the gross earnings from all business upon the leased line, which it guaranteed should not be less than \$500,000 per annum.

"In 1884 the lease was modified by annulling this guarantee, and excepting from contribution to rental the receipts from business originating on or destined to the Ontario & Western road (north of Middletown), until such time as the gross receipts from all business on the leased line should equal \$2,000,000 per year for two successive years.

"The modifying agreement referred to was claimed by the Trustee under the West Shore mortgage to be invalid as against the bondholders under that mortgage, and although the Ontario Co. was not a party to the West Shore foreclosure action at the time the decree was taken, the purchasers at the sale and the reorganized company insisted that the modifications were not effectual as against them.

"The Ontario Co., with the West Shore Co., guaranteed the payment of the principal and interest on \$10,000,000 first-mortgage bonds of the Terminal Co., and as joint lessee with the West Shore Co. of the terminal property was liable for the payment, as rent, of the interest upon all indebtedness of the Terminal Co., as well as for the expenses of the care and maintenance of the property in proportion to the use thereof.

"Under these circumstances, it seemed vital to effect some arrangement through which the Ontario Co. would avoid litigation, be relieved of its obligations in respect to the terminal and the leased line, still retain a satisfactory means of communication with New York, and yet receive some compensation for the sums which represent the cost to it of the leased line and the terminal facilities. Such a settlement was finally made, which, so far as it affects the road and the terminal property, is contained in the agreement dated Jan. 1, 1886, a copy of which is submitted with this report.

"This adjustment releases the Ontario Co. entirely from all its obligations under the leases of the road and the terminal property, and from its guarantee upon the terminal bonds, which guarantee has been cancelled; gives the Ontario Co. title in fee of the Middletown Branch, 25 miles in length; transfers to the West Shore Co. and the Central Co. as its lessee the operation of the road south of Cornwall, reserving to the Ontario Co. the right, until May 12, 1879, to run its

own trains between Cornwall and Weehawken, and to have its passengers and freight transported through the terminal and to and from New York.

"The Middletown Branch is free from and the trackage and terminal rights under the new West Shore mortgage. The rates which the Ontario Co. is to pay for the use of the road are, and must continue to be, very low, while the charges for terminal services are reasonable and such as our business will warrant paying.

"The West Shore Co. acquires no interest in the through business done upon the Ontario trains, and the number of trains is entirely within the discretion of the Ontario Co.

"Further, the holders of a majority of the preferred stock have agreed to exchange their stock for bonds under the provisions of an act of the Legislature recently passed providing for such exchange. This arrangement when perfected will place the election of all the directors with the common stock."

Richmond & Allegheny.

This company owns a line from Richmond, Va., to Clifton Forge, 230.25 miles; branch from Balcony Falls to Lexington, 18.96; the Tidewater connection in Richmond, 1.31; the Buckingham connection, 0.33; the Valley Railroad connection in Lexington, 1.40 miles. It leases 0.72 miles of the Valley road, and the Buckingham Railroad, New Canton to Arvon, 3.91 miles; a total of 252.25 miles owned and 256.88 worked. The Henrico road, formerly leased, is not now worked. The road is built on the line of the old James River & Kanawha Canal, which was bought by this company.

The road is in the hands of Lawrence Myers and Decatur Axtell, receivers in suits pending for foreclosure, and they have made a very full report for the year ending Sept. 30 last.

The equipment includes 19 locomotives; 16 passenger, 2 observation, 3 sleeping and 10 baggage cars; 373 box, 47 stock, 412 flat, 12 gondola, 50 coal and 10 caboose cars; 3 service cars.

The general account, condensed, is as follows:

Stock	\$5,000,000
Funded debt	7,994,000
Allegheny car trust	393,000
Receivers' certificates	309,500
Bills payable and other liabilities	869,929
Profit and loss	358,616
Total	\$14,840,045
Road and property	\$14,486,768
Stocks and bonds	241,800
Materials	33,798
Accounts and balances	42,341
Cash	35,438
Total	\$14,840,045

Receivers' certificates increased \$60,500 and car trusts decreased \$23,000. Stock and funded debt were unchanged. The funded debt includes \$4,925,000 firsts, \$2,964,000 second, \$34,000 improvement bonds and \$71,000 Manchester city bonds. There are also \$75,000 firsts, \$1,036,000 second and \$82,000 improvement bonds pledged as collateral for floating debt, and \$118,000 improvement bonds held by trustees.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Freight	\$337,236	\$331,650	I.	\$5,586 1.7
Passenger	152,348	160,150	D.	7,802 4.9
Mail, etc.	44,533	49,722	D.	5,189 10.4
Water rents and docks	55,484	62,561	D.	7,077 11.3
Total	\$589,591	\$604,083	D.	\$14,492 2.4
Expenses	404,918	420,104	D.	15,186 3.6
Net earnings	\$184,673	\$183,979	I.	\$694 0.4
Gross earn. per mile	2.517	2.301	I.	.216 9.7
Net " "	.721	.701	I.	.20 0.3
Per cent. of exps.	68.7	69.5	D.	0.8

The gross earnings of the railroad, excluding all receipts from water power and docks, were \$534,107, or \$2,069 per mile; the expenses \$376,927, or 70.5 per cent., and the net earnings, \$157,280, or \$618 per mile.

The income account is as follows, condensed:

Net earnings, as above	\$184,673
Rentals, taxes, interest, etc.	82,173
Net balance	\$102,500
Receivers' certificates sold	60,500
Increase in accounts payable, etc.	1,887
Total	\$164,887

Construction, equipment and real estate \$79,677
Buckingham R. R. bonds 29,000
Rivanna Canal 2,300
Car trust certificates redeemed 23,000
Bridge bonds redeemed 4,000
Increase in cash, etc., and decrease in bills 26,910

An arrangement has been made by which further payments under the car trust, after one payment of \$17,000 is made, are deferred for five years, and interest is reduced to 5 per cent.

The traffic for the year was as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passenger train miles	313,380	270,180	I.	43,200 16.0
Freight train miles	218,467	258,373	D.	39,906 15.5
Total locomotive miles	633,049	668,641	D.	35,592 5.0
Pass. car miles	1,138,658	1,089,890	I.	48,768 4.4
Freight car miles	3,985,967	3,682,623	I.	303,344 8.2
Passenger miles	155,000	148,528	I.	6,472 4.4
Passenger miles	5,909,889	5,592,373	I.	407,516 7.3
Tons freight carried	320,130	305,157	I.	14,973 4.9
Ton-miles	28,183,853	24,549,022	I.	3,634,831 14.8

Av. train load:
Passengers, No. 19.1 21.0 D. 1.9 9.0
Freight, tons 129.0 95.0 I. 34.0 35.8
Average rate:
Per passenger-mile 2.540 cts. 2.860 cts. D. 0.320 ct. 11.2
Per ton-mile 1.167 " 1.434 " D. 0.267 " 16.5

The average rate per ton-mile east-bound was 1.023 cents; west-bound, 1.792 cents. The average rate per passenger-mile was, regular, 3.19 cents; commutation and mileage tickets, 2.12 cents; excursion, 0.78 cent. The express business amounted to 988 tons carried 88,680 miles, at an average rate of 22.176 cents per ton-mile. While the rate on local freight was 1.963 cents per ton-mile, that on connection freight was 0.801 and on through freight 0.572 cent. Local freight furnished 35.2 per cent. of the total ton-mileage, connection freight 58.8, and through freight 6.0 per cent. The earnings per passenger train mile were \$0.60 and for freight train mile \$1.54. Locomotive service cost 12.2 cents per mile run.

During the year many improvements have been made in road, bridges, buildings, and equipment. The obligation to drain the abandoned levels of the canal has been complied with, and much of the old bed has been leased to holders of adjacent property.

In order to protect the company's ownership of part of the Rivanna Canal, control of the whole line of 25 miles has been obtained, and boats are now run for the whole distance. The Buckingham Railroad has been completed, and was operated for five months of the year.

Several new bridges and a change of alignment at several points are still needed to put the road in good condition.

Rochester & Pittsburgh.

This company operates lines from Rochester, N. Y., to Salamanca, 108 1/2 miles; Buffalo to Ashford Junction, N. Y., 47 miles; Silver Lake, N. Y., to Gainesville, 1 mile; Bradford Junction, N. Y., to Punxsutawney, Pa., 137 1/2 miles; a total of 264 miles. The line operated is owned, with the exception of 38 miles, from Johnsonburg, Pa., to Custer, the use of which is leased from the New York, Lake Erie & Western Co., for \$55,200 yearly and a proportionate share of the cost of maintenance.

The following statements for the year ending Sept. 30 last are from the report presented at the recent annual meeting.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Earnings	\$1,216,679	\$1,069,932	I.	\$146,747 13.7
Expenses	849,224	790,964	I.	58,260 7.4
Net earnings	\$367,455	\$278,968	I.	\$88,487 31.7
Gross earn. per mile	4.134	3.639	I.	.495 13.7
Net " "	1.250	.949	I.	.301 31.7
Per cent. of exps.	69.8	73.9	D.	4.1

This shows a very considerable increase in both gross and net earnings.

The result of the year was as follows:

Net earnings, as above	\$367,455
Interest, taxes and rentals	484,900
Deficit	\$117,445
Old accounts settled	14,286
New construction	192,764
Total deficit for the year	\$324,465

In addition to the above, there have fallen due and been extended \$77,000 of car trust bonds. The above does not include interest on the second mortgage bonds, which were being foreclosed.

The road has been sold under foreclosure of second mortgage, and is now being reorganized as the Buffalo, Rochester & Pittsburgh.

Richmond, Fredericksburg & Potomac.

This company owns a railroad from Richmond, Va., to Quantico, 83 miles. The report is for the year ending Sept. 30 last.

The equipment includes 17 locomotives; 15 passenger, 2 postal and 7 baggage and express cars; 50 box, 47 flat, 1 coal and 10 caboose cars; 18 material or service cars.

The general account is as follows, condensed:

Common stock	\$1,793,900
Guaranteed stock	500,400
Dividend scrip	600
Funded debt	817,811
Current accounts	160,745
Profit and loss	166,408
Total	\$3,379,864
Road and equipment	\$3,075,108
Materials on hand	39,455
Accounts and balances receivable	221,897
Cash	43,404
Total	\$3,379,864

The funded debt includes \$681,436 bonds due at various dates and \$136,375 certificates of indebtedness. Of the guaranteed stock, \$19,300 bear 6 and the rest 7 per cent. interest.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passenger trains	\$324,519	\$317,090	I.	\$7,429 2.3
Freight trains	144,893	152,107	D.	7,214 4.7
Rents	2,501	2,508	D.	7 0.3
Total	\$471,913	\$471,705	I.	\$208 0.1
Expenses	280,037	280,840	D.	803 0.3
Net earnings	\$191,876	\$191,865	I.	\$11 0.0
Gross earnings per mile	5.686	5.683	I.	3 0.1
Net " "	2.311	2.191	I.	120 5.5
Per cent. of expenses	59.4	61.5	D.	2.1

Expenses include all renewals and additions to property and equipment.

The result of the year was as follows:

Net earnings, as above	\$191,816
Interest on bonds and loan	\$50,624
Dividends on guaranteed stock	34,835
Surplus for the year	\$106,357

No dividends were paid on the common stock. The surplus was equivalent to 5.9 per cent on that stock.

The traffic for the year was as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Train miles:				
Passenger	107,623	202,324	D.	4,701 2.3
Freight	107,120	107,217	D.	97 0.1
Material	12,096	12,430	D.	334 2.7
Total	316,839	321,971	D.	5,132 1.6
Pass. car miles	1,018,298	863,946	I.	154,352 17.9
Freight car miles	1,951,089	1,919,810	I.	31,279 1.6
Service car miles	217,728	233,740	D.	6,012 2.7
Passengers carried	218,110	209,725	I.	8,385 4.0
Passenger miles	9,724,375	9,057,132	I.	667,243 7.4
Tons freight carried	166,961	160,606	I.	6,355 3.9
Ton-miles	9,303,055	8,881,279	I.	421,776 4.7

Av. train load:
Passengers, No. 45.0 44.0 I. 1.0 2.3
Freight, tons 84.8 80.0 I. 4.8 5.2

Av. rate:
Per passenger-mile 2.60 cts. 2.69 cts. D. 0.09 ct. 3.3
Per ton-mile 1.59 " 1.78 " D. 0.17 " 9.7

The freight traffic includes 2,918 tons express freight carried 219,506 miles, at an average rate of 8.63 cents per ton-mile.

During the year 1,000 tons of steel rails and 35,311 new ties were used in renewals. The road is now all laid with steel. A new passenger engine and an express car were added to the equipment.